9.22.2014

CHMURA
Economics & Analytics

The San Bernardino County Economy

Economic Trends and Forecasts
Quarter 4, 2013 - Quarter 2, 2014

This report details the macroeconomic conditions in the nation and the state of California over the next two years. It examines the Inland Empire's economy and industries for their ability to drive job growth. It also identifies those occupations that may become a supply-constraint to future job creation as well as occupations that pay above-average wages that are expected to see strong employment growth.

Prepared for San Bernardino County Workforce Investment Board

Richmond, Virginia

1309 East Cary Street
Richmond, Virginia 23219
804.649.1107 (phone)
804.644.2828 (fax)

Cleveland, Ohio

1025 East Huron Road
Cleveland, Ohio 44115
216.357.4730 (phone)
216.357.4730 (fax)

CHMURA ECONOMICS & ANALYTICS

Table of Contents

I. Executive Summary

- The San Bernardino-Riverside economy's recovery has gained traction:
  - Employment is set to expand by 2.3% in 2014; the California economy is also poised for moderate employment growth.
    - Job growth is expected to be relatively strong across jobs requiring all levels of education.
    - The unemployment rate is trending down, but likely to remain elevated throughout 2015.
    - The Inland Empire lags the state and the nation in terms of postsecondary education attainment in its populace.
  - The local housing marketing is struggling to gain traction, but home prices continue to increase at a healthy pace.
    - Distressed sales as a share of total sales are on a downward trend, particularly in Riverside County.
    - Home sales in the region have declined over the past year; the slowdown in the Inland Empire's housing recovery may be due in part to a drop in demand from investors who purchase distressed sales and a tight supply of homes for sale.
- The region has five broad sectors that are primed to create the bulk of jobs over the next three years: healthcare; transportation and warehousing; retail trade; wholesale trade; and construction.
  - Within these sectors, 20 industries at the four-digit NAICS level were identified as having strong growth potential based on long-run growth rates, high location quotient, three-year job gains, and three-year competitiveness.
  - The Inland Empire has four industry clusters that are likely to expand employment in excess of 2.5% per year over the next decade based on Chmura's long-run growth model. These industries—utilities, professional services, healthcare, and construction—represent almost one-third of the total employment in the region.
- An occupation analysis identified 74 occupations requiring associate's degrees or non-degree awards as typical education for entry; these occupations had annual average wages close to or above the region's average.
  - The occupations requiring an Associate's degree as typical education for entry with the highest annual demand are Registered Nurses and General and Operations Managers with total annual demand of 1,114 and 786, respectively.
    - Several of the occupations requiring an Associate's degree as typical education for entry are Science, Technology, Engineering, and Mathematics (STEM) occupations including Electrical and Electronic Engineering Technicians and Life, Physical, and Social Science Technicians, All Other.
  - The occupations requiring a Postsecondary non-degree award as typical education for entry with the highest annual demand are Licensed Practical and Licensed Vocational Nurses and Firefighters with total annual demand of 150 and 103, respectively.

II. Background

The San Bernardino County Workforce Investment Board (WIB) is charged with addressing major workforce issues in the county. The WIB's role is to convene appropriate parties around these issues; create dialogue among relevant parties; generate creative, innovative solutions through consensus; and to enlist community commitments to action in order to achieve a competitive advantage.[1]

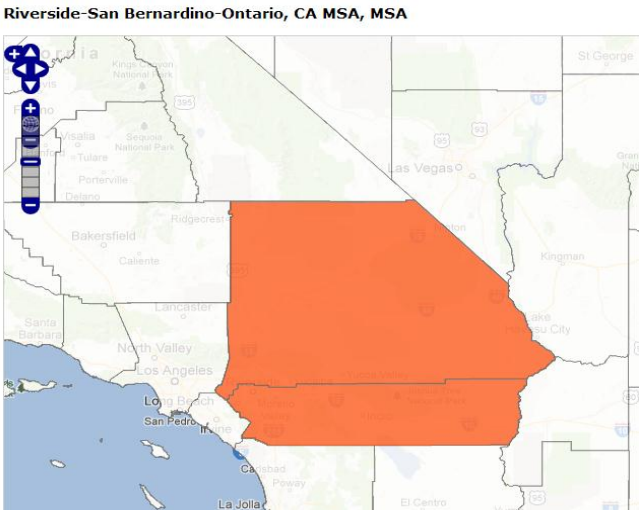
This report provides an overview and forecast of the Inland Empire, state, and national economies to identify workforce issues for the San Bernardino County WIB.[2] The following topics are emphasized in this analysis:

- Demographics - population characteristics of the Inland Empire area
- Economic characteristics of the population in the Inland Empire
- Composition of the labor market
- Commercial and residential real estate market characteristics
- Employment forecast and occupational analysis for the Inland Empire

Geography and Labor Shed

While the San Bernardino County WIB contracted this research, it is generally recognized that its economy and natural labor shed includes neighboring Riverside County. Together these two counties comprise the "Inland Empire" region (San Bernardino and Riverside Counties) which is equivalent to the Riverside-San Bernardino-Ontario, California Metropolitan Statistical Area (MSA). Throughout this report, the Riverside-San Bernardino-Ontario, California MSA is considered the primary labor shed. This report also references data at the state level, as well as for the nation as a whole.

Figure 1: Riverside-San Bernardino-Ontario, California MSA



[1] http://cms.sbcounty.gov/wib/Home.aspx

[2] The County of San Bernardino Workforce Investment Board (WIB) requested labor market information that covers the Inland Empire region of California, via a written report and presentation twice per year. Chmura Economics & Analytics (Chmura) was retained to provide this economic analysis and its interim reports.

III. National & Regional Economic Outlook

The national economy continues to improve but the labor force remains weak. Growth in real gross domestic product (GDP) rose an annualized 4.2% in the second quarter of 2014 after contracting at a 2.1% annual rate in the first quarter of 2014. Non-farm employment accelerated with 800,000 non-farm jobs added over the quarter compared with 569,000 in the first quarter, while the unemployment rate declined from 6.7% in the first quarter to 6.1% in the second quarter. The unemployment rate that accounts for individuals working part time that would prefer fulltime work and the marginally attached[3] remains at a relatively high 12.1%. Home prices continued to climb, but the pace of appreciation has slowed; higher borrowing costs coupled with rising home prices have tempered the housing market recovery.

The Inland Empire region and state of California also continued to improve but remain slower than the nation.

National Outlook, 2014-2015

Chmura forecasts real GDP to grow at an annualized pace of 2.8% in the third quarter of 2014 and 2.1% for the entire year. Although the labor market recovery has gained momentum wage growth remains modest and the participation rate is low. The real estate market has shown some signs of weakness over the past year. In this environment of continued modest growth and elevated unemployment, the federal funds rate target is expected to remain in the current range of 0% to 0.25% until the second quarter of 2015.

For the second quarter of 2014, real GDP grew an annualized 4.2%, after declining 2.1% in the first quarter. U.S. employers added jobs at a healthy pace in the second quarter of 2014 following moderate employment growth in the first quarter. Non-farm private payroll growth for the second quarter expanded at a 2.2% annualized pace after expanding 1.5% in the first quarter of 2014. The national unemployment rate declined to 6.1% in June 2014, from 6.7% in March. Home sales, though above severely depressed levels, remain low by historical standards while the Federal Housing Finance Agency's House Price Index for the second quarter shows prices have increased on a year-over-year basis in 49 of 50 states. The housing sector was a positive contributor to GDP growth in 2013, but was a drag on growth in both the fourth quarter of 2013 and the first quarter of 2014. In the second quarter of 2014, housing was a positive contributor to GDP growth, a trend which Chmura expects to continue. The U.S. stock market has weathered concerns about the Federal Reserve ending its bond-buying program and investors are now looking for clues from U.S. central bankers about the timing of the first interest rate increase. Our most-likely forecast assumptions reflect an improving economy with few lasting effects from the government's austerity measures. The results are steady but moderate GDP growth and job creation. Our alternative scenario assumes geopolitical unrest pushes oil prices higher, depressing consumer confidence and employment.

The most-likely scenario assumes the price of oil averages $103 a barrel in 2014 before declining to $99 per barrel in 2015 due to weak demand overseas. The alternative scenario assumes that unrest continues in the Middle East, driving oil prices higher; prices rise from $111 in 2014 to $141 per barrel in 2015. The labor market is expected to continue to improve in both scenarios. The unemployment rate is likely to average 6.2% in 2014 and fall to 5.6% in 2015 according to the most-likely scenario. In the alternative scenario, the unemployment rate is forecast to fall from 6.3% in 2014 to 5.9% in 2015. The Federal Open Market Committee (FOMC) is expected to keep its

[3] According to the Bureau of Labor Statistics, marginally attached workers "are those who currently are neither working nor looking for work but indicate that they want and are available for a job and have looked for work sometime in the past 12 months."

historically low federal funds rate target through the 1st quarter of 2015 under the most-likely scenario, and later in 2015 under the alternative scenario as slower growth leads the Federal Reserve Bank to delay tightening.

Figure 2: National Macro Forecast, 2014-2015

		Forecast	
	2013	2014	2015
Real GDP	2.2%	2.1%	3.1%
Unemployment Rate	7.4%	6.2%	5.6%
Real Non-Residential Investment	3.0%	5.8%	7.3%
Real Consumer Spending	2.4%	2.2%	2.3%
Financial Market			
Oil Prices	$98	$103	$99
Federal Funds Rate	0.1%	0.1%	0.8%
10-Year Treasury	2.4%	2.6%	3.5%

Source: Chmura Economics & Analytics

Changes from Previous Forecast

Chmura's 3rd quarter 2014 overall growth forecast for 2014 and 2015 is modestly changed from our estimate in the 3rd quarter of 2013; we have revised downward our estimate of real gross domestic product for 2014 (the 3rd quarter 2013 forecast was for a 2.7% increase), which now stands at 2.1%, while we have revised slightly upward our estimate for real consumer spending (the 3rd quarter 2013 forecast was 2.0% in 2014), which is now 2.2% for 2014. In addition, our forecast for the unemployment rate in 2014 was revised downward from 6.8% in the 3rd quarter of 2013 to 6.2%. The yield on the 10-year Treasury note has increased slightly slower than we expected and is forecast to be 2.6% in 2014 compared with 2.8% in the 3rd quarter 2013 estimate.

U.S. Employment Surpasses Previous Peak

In terms of the labor market, the recovery from the 2007-2009 recession has been the slowest of all post-World War II recoveries. In May 2014, nearly five years after the recession ended, U.S. employment surpassed its previous employment peak reached in January 2008. Although labor market conditions have improved, the unemployment rate remains high, labor force participation has declined, and wage growth has been disappointingly weak.

This recovery, in contrast to many recoveries from previous recessions, has been very mixed in terms of the experience of individual states. In past recoveries, particularly in the early 1990s and mid-2000s, most states saw steady gains in employment and wages and sustained drops in unemployment claims and the unemployment rate; this recovery has been quite different. Many states—including California—have seen much weaker labor market recoveries as evidenced by their unemployment rates, claims data, and overall job growth. Meanwhile, some states, such as Texas and Utah, charted new records in employment well before the nation.

California Outlook, 2014-2015

Employment declined at a faster pace in California and the state lost a larger share of its employment than the nation as a whole during and following the last recession; since the beginning in 2012, however, employment in California has increased faster on a year-over-year basis than U.S. employment. In 2013, California's employment

increased 2.8%, faster than the 1.7% increase in the nation. Chmura forecasts employment in California to increase by 2.4% in 2014 and by an additional 2.3% in 2015, whereas the unemployment rate will average about 7.4% in 2014 and 6.7% in 2015.

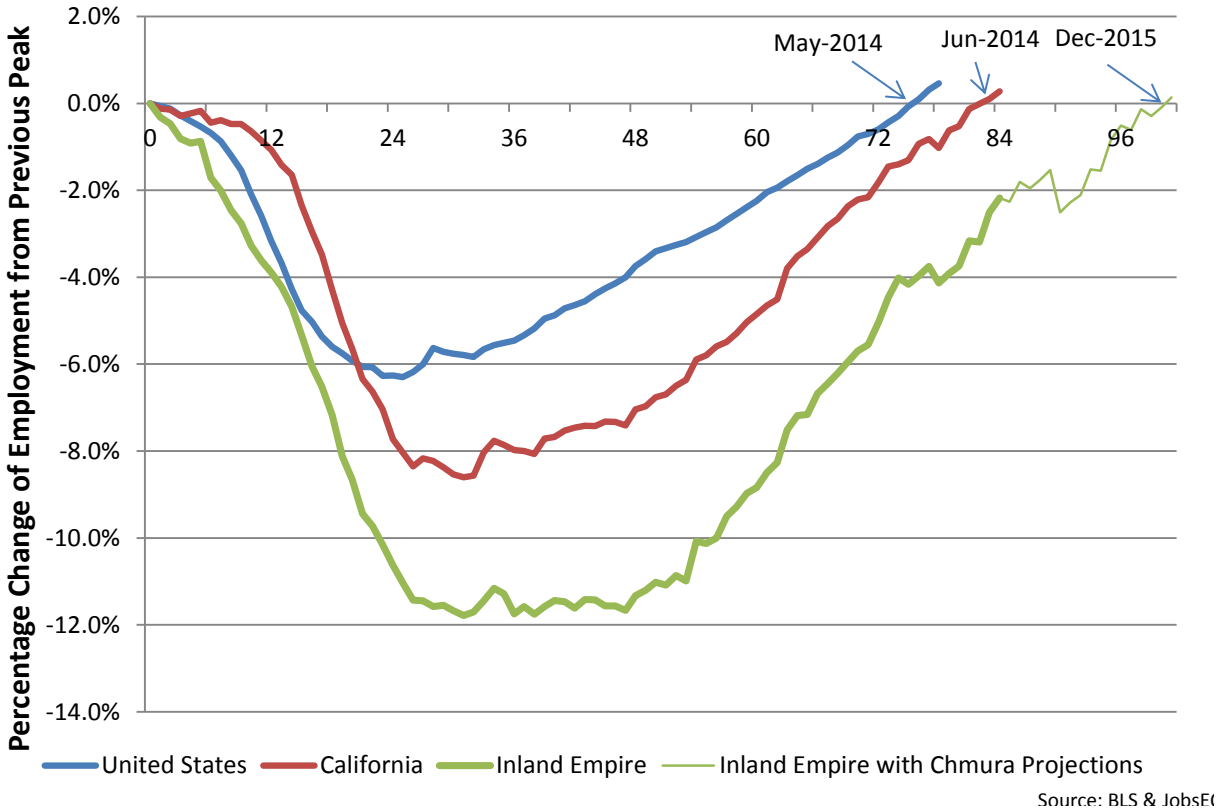
Figure 3: California Employment Summary Forecasts

	California Employment Growth**			California Unemployment Rate		
	2013*	2014	2015	2013*	2014	2015
Chmura Forecast	2.8%	2.4%	2.3%	8.9%	7.4%	6.7%

Forecasts as of September 2014
*Actual
**Employment refers to nonagricultural employment.

Employment in California contracted by about 9% from its mid-2007 peak to its trough in early 2010. Since July 2011—at which point the California economy began to steadily add employment—the state economy has averaged approximately 32,000 new jobs per month. In June 2014, employment in California surpassed its July 2007 peak. As of July 2014, employment was 0.3% above the July 2007 employment peak.

Figure 4: When Will Employment in the Inland Empire Surpass its Pre-Recession Peak?

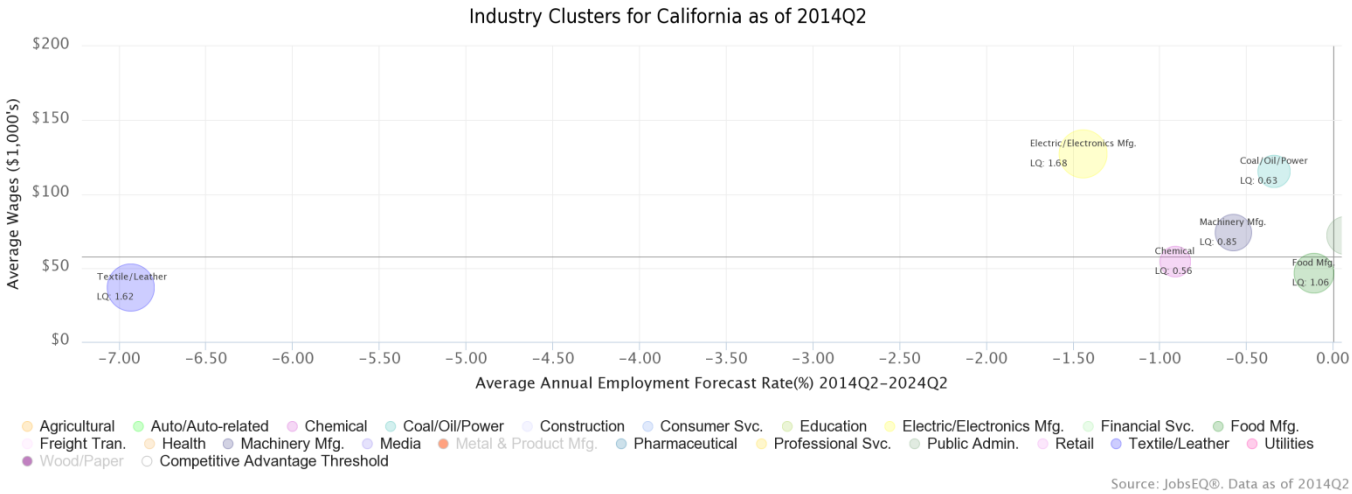


Source: BLS & JobsE(

In the past three years, California's economy has added approximately 1,087,000 jobs. Of these new jobs, 86% were created in only four sectors: professional, scientific and technical services; accommodation and food services; administrative and waste management and remediation services; and healthcare and social assistance. Meanwhile,

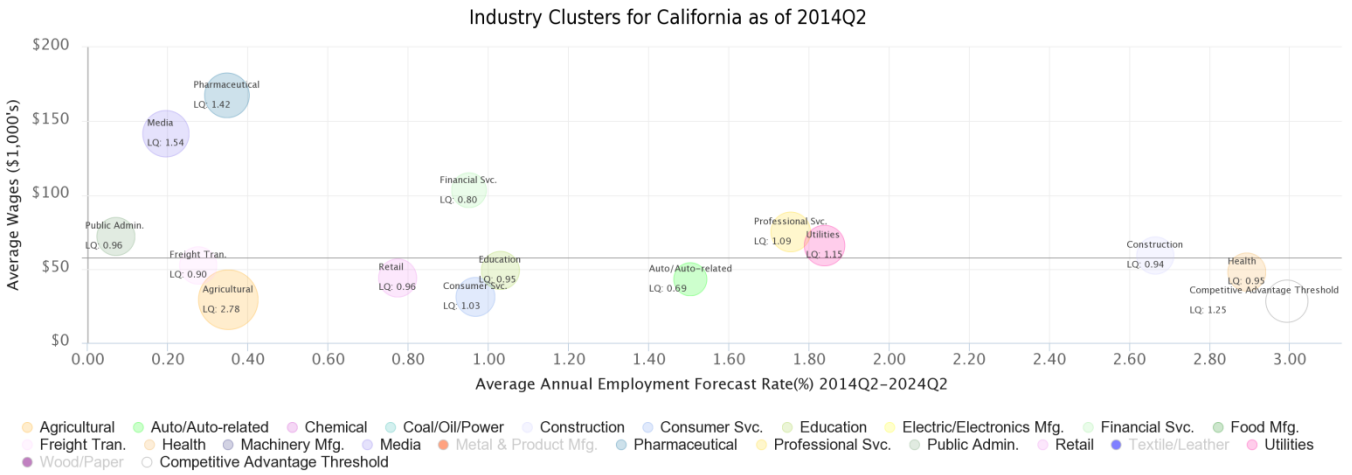
California's public administration sector has continued to shed jobs as state and local budgets are cut and employment in its education services sector has increased by less than 1%. The Golden State's manufacturing sector has added a net 7,700 jobs (average annual growth of 0.2%) in the past three years—second quarter 2011 to second quarter 2014.

Figure 5: California Industry Clusters with Expected Employment Declines



Source: JobsEQ®. Data as of 2014Q2

Figure 6: California Industry Clusters with Expected Employment Gains



Source: JobsEQ®. Data as of 2014Q2

In terms of the location quotient (LQ)—a common measure of the relative size of an industry and traditional gauge of the presence of competitive clusters—California has competitive clusters in agriculture (LQ=2.78), pharmaceutical manufacturing (1.42), electrical/electronic manufacturing (1.68), textiles/leather manufacturing (1.62), and media (1.54). Annual average employment growth over the next decade is expected to be slow for the pharmaceutical (+0.3%), media (+0.2%), and agricultural (+0.4%) clusters. Moreover, the textile/leather manufacturing cluster is forecast to shrink by 6.9% annually and employment in the electrical/electronics manufacturing cluster is forecast to decline by 1.4% annually. The state's three clusters with the fastest long-run employment growth projections are health sector (+2.9%), construction (+2.7%), and utilities (+1.8%).

IV. Inland Empire Economic Outlook

The remainder of this report focuses on the Inland Empire region, San Bernardino and Riverside counties, which is equivalent to the Riverside-San Bernardino-Ontario, California MSA.

Demographic Profile

The Riverside-San Bernardino-Ontario, California MSA is home to more than 4.3 million people and represents about 11.4% of California's total population. Over the past ten years, this region has grown an average 1.7% per year--much faster than the state and national average of 0.8% per year. Chmura projects the population of the Riverside-San Bernardino-Ontario, California MSA will continue to grow faster than the state over the coming decade, which in turn will help bolster the region's long-run economic prospects.

Figure 7: Population Growth Statistics

Region	Average Yearly Population Growth 2003-2013	Working Age Population Growth 2014-2021	Ratio of Retirees to Working Age Population in 2021
Inland Empire	1.7%	+15%	4.83
California	0.8%	+7%	4.67

Source: Chmura Economics & Analytics

The Inland Empire region has a poverty rate 1.6 percentage points above that of the nation and 1.2 percentage points above California's poverty rate. Overall, the Inland Empire is nearly half Hispanic or Latino according to the U.S. 2010 Census, and about 40% non-white. African Americans account for 7.6% of the population and 6.1% of the region's population is Asian-American. This demographic profile is distinct from the rest of California—with roughly a 13% Asian-American mix—and starkly different from the demographic make-up of the nation where Latinos account for only about 16.3% of the total population. The Inland Empire region has approximately the same level of military personnel living in the area as state and national norms.

The average educational attainment in the Inland Empire is lower than both state and national averages. The share of population in the Inland Empire with no high school diploma is 20.7% compared with 18.1% for California and 12.3% for the nation. Similarly, the share of the Inland Empire's population with a bachelor's degree is only 13.0% compared with 20.2% in California and 19.3% in the nation. Overall postsecondary attainment—share of the population with an associate's degree or higher—is about 11.7 percentage points lower than the California average of 39.3% and 11.2 percentage points below the national norm of 38.8%.

Figure 8: Demographic Profile Riverside-San Bernardino-Ontario, CA MSA

Demographic Profile[1]

	----------Percent----------			----------Value----------		
	Riverside-San Bernardino-Ontario, CA MSA	**California**	**USA**	**Riverside-San Bernardino-Ontario, CA MSA**	**California**	**USA**
Demographics						
Population[2]	—	—	—	4,380,878	38,332,521	316,128,839
Population Annual Average Growth[2]	1.7%	0.8%	0.8%	76,311	307,936	2,602,091
Median Age[3]	—	—	—	32.7	35.2	37.2
Under 18 Years	28.8%	25.0%	24.0%	1,214,696	9,295,040	74,181,467
18 to 24 Years	10.9%	10.5%	9.9%	458,633	3,922,951	30,672,088
25 to 34 Years	13.4%	14.3%	13.3%	564,520	5,317,877	41,063,948
35 to 44 Years	13.4%	13.9%	13.3%	566,254	5,182,710	41,070,606
45 to 54 Years	13.5%	14.1%	14.6%	570,032	5,252,371	45,006,716
55 to 64 Years	9.7%	10.8%	11.8%	410,782	4,036,493	36,482,729
65 to 74 Years	5.8%	6.1%	7.0%	244,093	2,275,336	21,713,429
75 Years, and Over	4.6%	5.3%	6.0%	195,841	1,971,178	18,554,555
Race: White	58.9%	57.6%	72.4%	2,488,308	21,453,934	223,553,265
Race: Black or African American	7.6%	6.2%	12.6%	322,405	2,299,072	38,929,319
Race: American Indian and Alaska Native	1.1%	1.0%	0.9%	46,399	362,801	2,932,248
Race: Asian	6.1%	13.0%	4.8%	259,071	4,861,007	14,674,252
Race: Native Hawaiian and Other Pacific Islander	0.3%	0.4%	0.2%	13,744	144,386	540,013
Race: Some Other Race	21.0%	17.0%	6.2%	887,896	6,317,372	19,107,368
Race: Two or More Races	4.9%	4.9%	2.9%	207,028	1,815,384	9,009,073
Hispanic or Latino (of any race)	47.3%	37.6%	16.3%	1,996,402	14,013,719	50,477,594
Economic						
Labor Force (civilian population 16 years & over)[4]	61.6%	64.0%	64.2%	1,951,715	18,673,806	156,533,205
Armed Forces Labor Force[4]	0.6%	0.5%	0.5%	18,541	147,620	1,131,106
Median Household Income[3,4]	—	—	—	$55,928	$61,400	$53,046
Poverty Level (of all people)[4]	16.5%	15.3%	14.9%	686,539	5,590,100	44,852,527
Mean Commute Time (minutes)[4]	—	—	—	30.7	27.1	25.4
Commute via Public Transportation[4]	1.6%	5.1%	5.0%	27,084	837,820	6,967,689

.

Figure 8: Demographic Profile (cont.) Riverside-San Bernardino-Ontario, CA MSA

	----------Percent----------			----------Value----------		
	Riverside-San Bernardino-Ontario, CA MSA	California	USA	Riverside-San Bernardino-Ontario, CA MSA	California	USA
Housing						
Total Housing Units	—	—	—	1,500,344	13,680,081	131,704,730
Median House Value (of owner-occupied units)[3,4]	—	—	—	$245,300	$383,900	$181,400
Homeowner Vacancy	3.5%	2.1%	2.4%	30,555	154,775	1,896,796
Rental Vacancy	9.1%	6.3%	9.2%	45,439	374,610	4,137,567
Renter-Occupied Housing Units (Percent of Occupied Units)	34.8%	44.1%	34.9%	452,093	5,542,127	40,730,218
Occupied Housing Units with No Vehicle Available (Percent of Occupied Units)[4]	5.3%	7.7%	9.0%	67,382	964,955	10,405,375
Social						
Educational Attainment: No High school Diploma[4]	20.7%	18.1%	12.3%	438,989	3,580,420	20,199,803
Educational Attainment: High School Graduate[4]	25.3%	20.0%	26.8%	536,166	3,971,294	43,850,577
Educational Attainment: Some College, No Degree[4]	26.3%	22.6%	22.1%	557,072	4,475,348	36,172,175
Educational Attainment: Associate's Degree[4]	8.0%	8.0%	8.5%	170,277	1,585,804	13,972,081
Educational Attainment: Bachelor's Degree[4]	13.0%	20.2%	19.3%	275,352	4,011,297	31,655,880
Educational Attainment: Post Graduate Degree[4]	6.5%	11.1%	10.9%	138,454	2,192,648	17,814,060
Disabled, Age 16 to 64 (Percent of Total Population)[4]	9.3%	8.0%	10.0%	235,038	1,855,637	19,128,854
Foreign Born[4]	21.6%	27.1%	12.9%	916,242	10,104,739	39,784,305
Speak English Less Than Very Well (population 5 yrs and over)[4]	16.6%	19.6%	8.7%	649,490	6,805,770	25,081,122

Source: JobsEQ®

1. Census 2010, unless noted otherwise

2. Census 2013, annual average growth rate since 2003

3. Median values for certain aggregate regions (such as MSAs) may be estimated as the weighted averages of the median values from the composing counties.

4. ACS 2008-2012

Recent Economic Performance & Outlook 2014-2015

The Riverside-San Bernardino-Ontario MSA was hit harder in the previous recession and housing crisis than most regions of California. In the first few years after the recession ended, the Inland Empire's recovery lagged behind the overall state as well as the nation. Job growth and wage gains in California were faster in 2011 and 2012 than

in the Inland Empire. In 2013, the Inland Empire economy outperformed the California economy in terms of job creation and wage growth. Chmura expects employment and wage growth in the Inland Empire to lag the state in 2014 and 2015, however.[4] Real retail sales should remain strong in the metro area, averaging 5.3% and 4.1%, respectively, in 2014 and 2015. Building permits, a leading indicator of economic activity, are projected to increase a modest 3.8% in 2014 followed by a 10.4% jump in 2015; in California, building permits are expected to increase 5.7% in 2014 and 9.3% further in 2015.

Figure 9: Recent and Forecast Economic Performance

Region/Indicators	Actual			Forecast	
San Bernardino MSA	**2011**	**2012**	**2013**	**2014**	**2015**
Employment*	0.9%	2.6%	3.5%	2.3%	1.7%
Wages and Salaries**	2.7%	3.4%	4.1%	3.9%	3.6%
Real Retail Sales	6.4%	5.3%	5.0%	5.3%	4.1%
Building Permits	-24.2%	24.6%	45.1%	3.8%	10.4%
California					
Employment*	1.1%	2.7%	2.8%	2.4%	2.3%
Wages and Salaries**	4.5%	5.8%	3.5%	5.4%	5.0%
Real Retail Sales	6.2%	5.3%	4.4%	5.2%	5.3%
Building Permits	7.1%	28.1%	31.9%	5.7%	9.3%

Source: Chmura Economics & Analytics

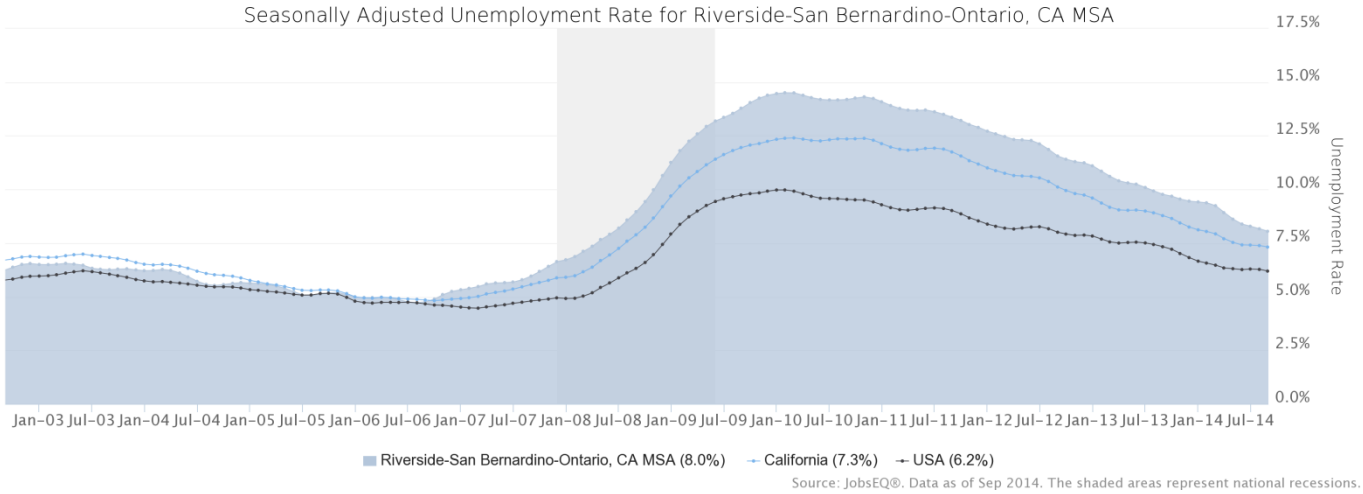
*Employment refers to nonagricultural employment.

**Wages and salaries include some options that were exercised.
Actual data are through the 2nd quarter of 2014.

The Inland Empire's unemployment rate tracked steadily lower in 2013 and 2014 (seasonally adjusted),[5] and is currently estimated to be 8.0% as of September 2014. The region's unemployment rate peaked at 14.5% in early 2010, has dropped 6.5 percentage points since then, but remains 1.8 percentage points higher than the national unemployment rate. The region is expected to surpass its previous level of peak employment by the end of 2015.

[4] Some sectors including transportation and warehousing and wholesale trade experienced much faster employment growth in the Inland Empire than in the state over the past year; growth in these sectors is expected to slow over the next several years possibly explaining why employment and wage growth in the Inland Empire is expected to lag the state in 2014 and 2015.
[5] The seasonal adjustment calculation in JobsEQ is based on a proprietary algorithm designed for online applications. Thus, seasonally adjusted data in JobsEQ may not match exactly with seasonally adjusted data from other sources, such as the Bureau of Labor Statistics (BLS).

Figure 10: Seasonally Adjusted Unemployment Trends



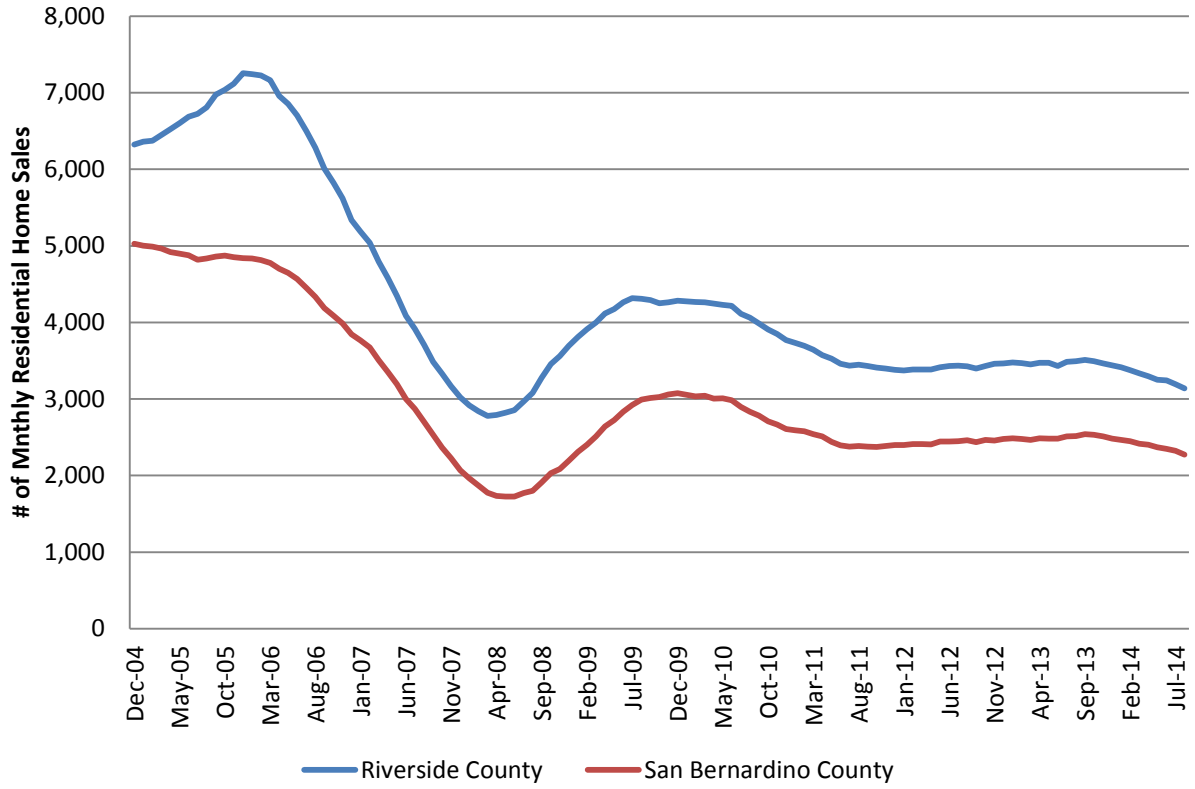
Housing Sector Analysis

The housing sector is struggling to gain traction in Riverside and San Bernardino Counties; home sales have declined modestly over the past year, while home prices continue to appreciate and the number of distressed sales has fallen. The twelve-month moving average of home sales has declined in both Riverside and San Bernardino Counties for 11 consecutive months beginning in October 2013. Higher mortgage rates and rising home prices have likely contributed to the slowdown in the housing recovery in the region. In positive news for the Inland Empire's housing market, several metrics indicate that the region's distressed housing stock (short-sales, foreclosures, and other non-traditional sales) are becoming a smaller share of overall sales. In fact, foreclosures represent less than 10% of all sales as of August 2014 in both San Bernardino and Riverside Counties after peaking in both counties at more than 60% in the first half of 2009. Additionally, housing prices have bottomed out and are moving steadily upward.

The commercial real estate market looks much stronger relative to the residential market, with vacancies moving steadily downward and rental/lease prices moving upward. The region's commercial sector looks particularly strong in the industrial segment. The industrial vacancy rate for the region stood at 6.9% in the 2nd quarter of 2014, one of the lowest rates in the nation. The Inland Empire also benefits from the ultra-low industrial space vacancy rates in Los Angeles (roughly 3.8%).[6]

[6] http://www.realtor.org/sites/default/files/reports/2014/embargoes/2014-q2-commercial-forecast/commercial-real-estate-outlook-2014-08-27.pdf

Figure 11: 12-Month Moving Average Home Sales

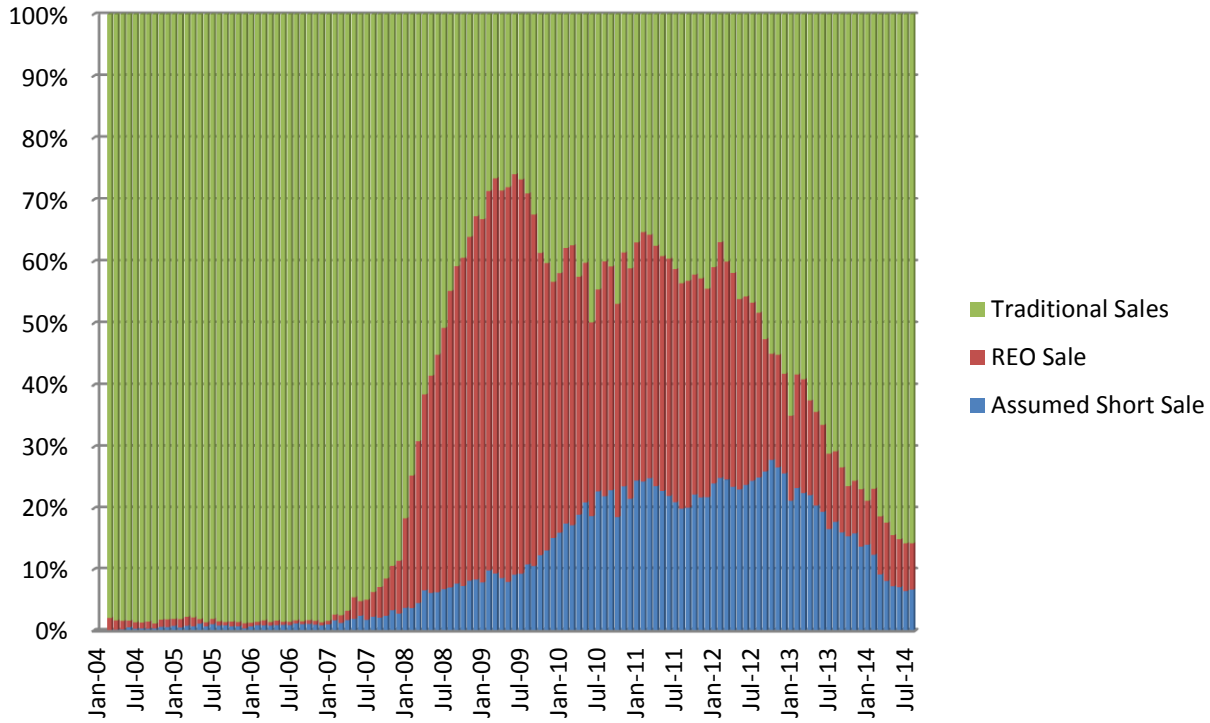


Sales in the San Bernardino residential housing market have drifted slightly downward since the end of 2013 as has the market in neighboring Riverside County. Housing prices (see Figure 13) continue to climb with 25 consecutive months of year-over-year price increases exceeding 10%. Additionally, the number of distressed sales as a share of overall residential sales has begun to decline consistently and the share of foreclosure sales is close to the corresponding rate in Riverside County.[7] Foreclosure sales in San Bernardino have declined to roughly 8% of all sales and the share of short sales fell from over 25% down to 7% of all sales in San Bernardino County by mid-2014. Chmura expects the twelve-month moving average of home sales will be in the range of 2,200 to 2,500 sales per month for the remainder of 2014—which is a level of sales consistent with the region's household formation fundamentals. A tight inventory of homes for sale in Southern California is hampering sales in the region;[8] if inventory increases in San Bernardino County, home sales would likely be closer to the high end of this range.

[7] The decline in home sales over the past year may be partially attributable to the drop in the number of distressed properties, which are often purchased by investors, for sale.

[8] http://www.sbsun.com/business/20140911/southern-california-home-sales-at-four-year-low-with-prices-at-post-recession-high

Figure 12: San Bernardino County: Residential Home Sales by Type



The housing market is slightly stronger in Riverside County than in San Bernardino County, where the number of foreclosure-based sales has been in decline for several years and is now only about 5% of all monthly sales. Short sales as a share of all sales in Riverside County peaked in the second half of 2012 but have since been trending steadily lower and are now about 6% of all monthly sales. Based on these trends, the share of total distressed sales will likely fall below 10% of all sales in 2015. Chmura expects that the twelve-month moving average of home sales—a simple way to remove the strong seasonality associated with home sales—will hover in the range of 3,100 to 3,400 sales per month for the remainder of 2014. Home sales may be at the top end of this range if the inventory of homes for sale in Riverside County increases.

Figure 13: Riverside County: Residential Home Sales by Type

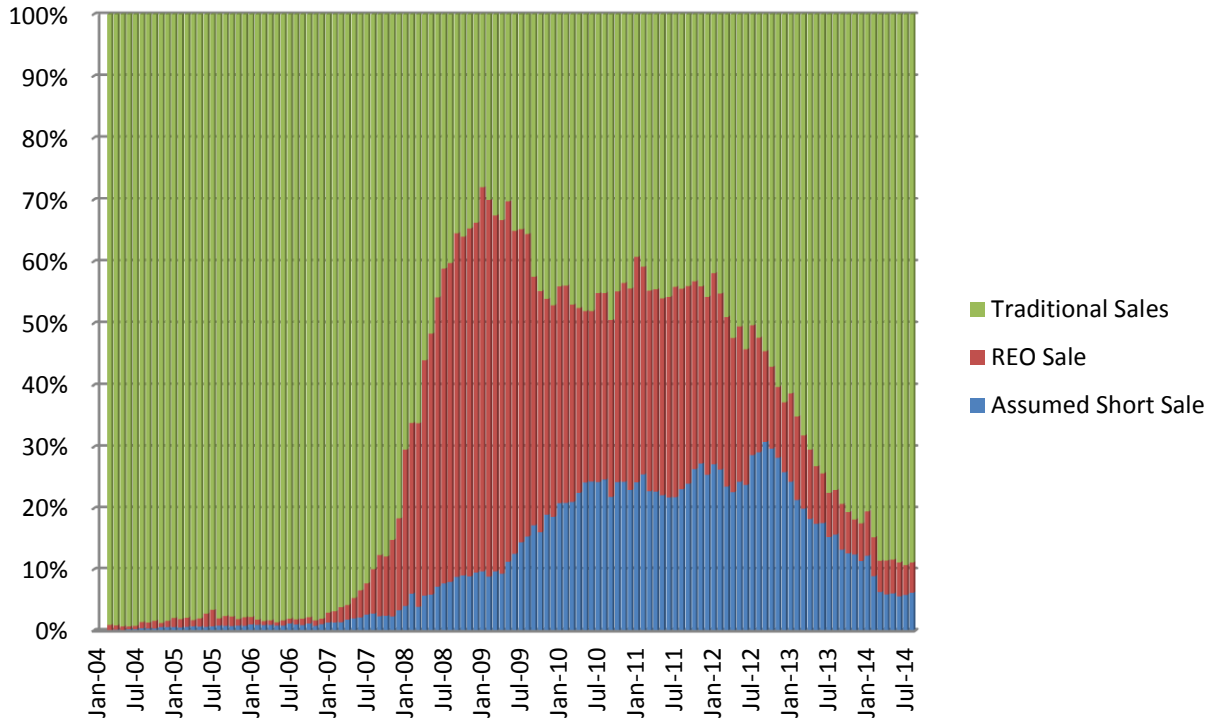
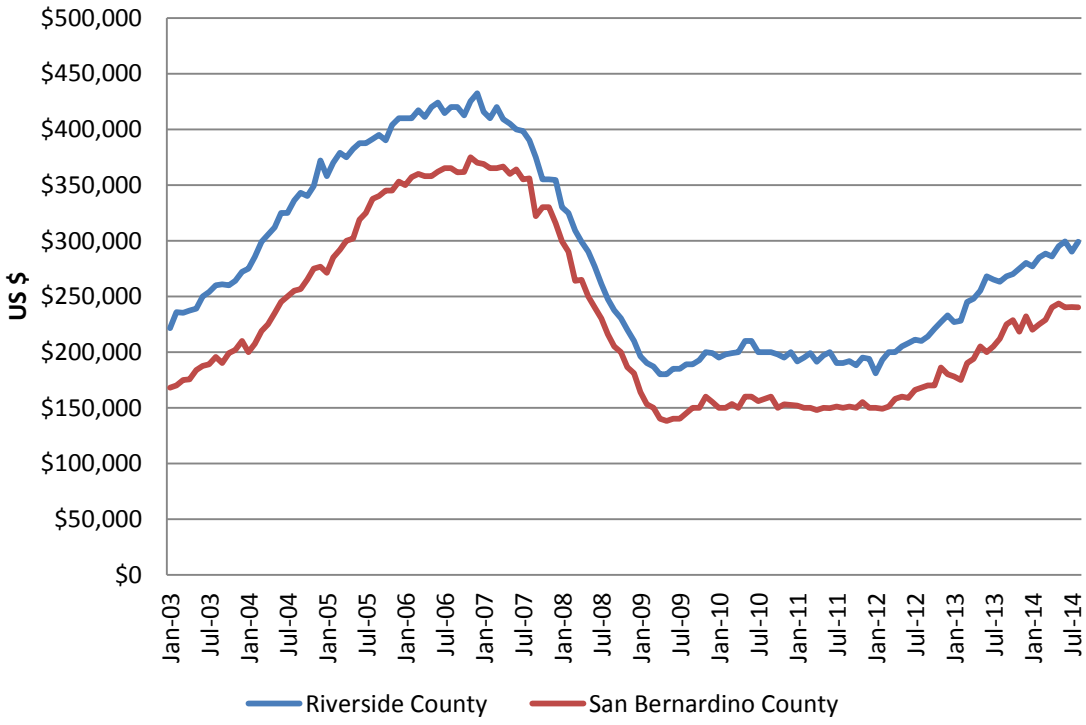


Figure 14: Median Single Family Home Prices



Industry Clusters and Job Creation Potential

A sector scorecard brings together several metrics to assess the relative ability of an industry to drive long-run employment gains. This analysis synthesizes several different employment-related trends to identify those industries that are thriving and likely to continue to thrive in the local economy; thus driving job gains. In particular, this analysis examines the location quotient, the three-year employment growth projection, and the three-year competitiveness score—which indicates if employment (not output) has increased after accounting for national employment trends and the local mix of industries.

Figure 15: Sector Scorecard

	Current			Historical				Forecast	
	Four Quarters Ending with 2014q2			Total Change over the Last 3 Years	Average Annual % Change in Employment 2011q2-2014q2			Next 3-Years	3-Year Analytic
Sector	Employment	Average Annual Wages	LQ	Employ-ment	Riverside-San Bernardino-Ontario, CA MSA	CA	USA	Average Annual Growth Percent	Local Compet-itiveness
Health Care and Social Assistance	180,498	$41,911	1.00	46,147	10.3%	9.2%	2.5%	3.5%	✓
Transportation and Warehousing	78,643	$42,495	1.63	13,267	6.4%	2.3%	1.7%	1.8%	✓
Retail Trade	167,606	$28,706	1.19	9,712	2.0%	2.1%	1.5%	1.7%	✓
Wholesale Trade	56,790	$53,296	1.06	7,935	5.1%	2.8%	1.8%	1.5%	✓
Arts, Entertainment, and Recreation	25,819	$26,875	1.14	-2,863	-3.4%	2.5%	2.1%	2.0%	
Manufacturing	86,544	$49,083	0.78	2,547	1.0%	0.2%	1.3%	0.9%	
Construction	70,967	$50,232	1.27	12,165	6.5%	5.6%	2.6%	3.4%	✓
Utilities	9,280	$84,879	1.25	-663	-2.3%	-0.5%	-0.2%	1.1%	
Total All Industries	1,242,678	$40,711	1.00	94,624	2.7%	2.4%	1.7%	2.2%	

Source: JobsEQ®

Based on this analysis, five sectors—health care and social assistance, transportation and warehousing, retail trade, construction, and wholesale trade—have particularly good prospects for driving future job growth in the Inland Empire.[9] While this analysis is a quantitative way to assess a sector's employment "health" as well as potential to drive future job growth, it is not a suitable methodology for assessing the long-run output (economic value measured in gross domestic product calculations) of a firm or sector, nor is it a reliable proxy for the underlying profitability of individual firms operating within the sector. Within these five sectors are 20 separate

[9] In the retail sector, only 4-digit industries with above-average wages were included. The six industries in this sector with wages which exceeded the average annual wage for the MSA are: automobile dealers (4411), other motor vehicle dealers (4412), electronics and appliance stores (4431), electronic shopping and mail-order houses (4541), vending machine operators (4542), and direct selling establishments (4543).

industries (4-digit NAICS) that have strong growth potential after factoring in the same criteria—long-run growth rates, high location quotient, three-year job gains, and three-year competitiveness.

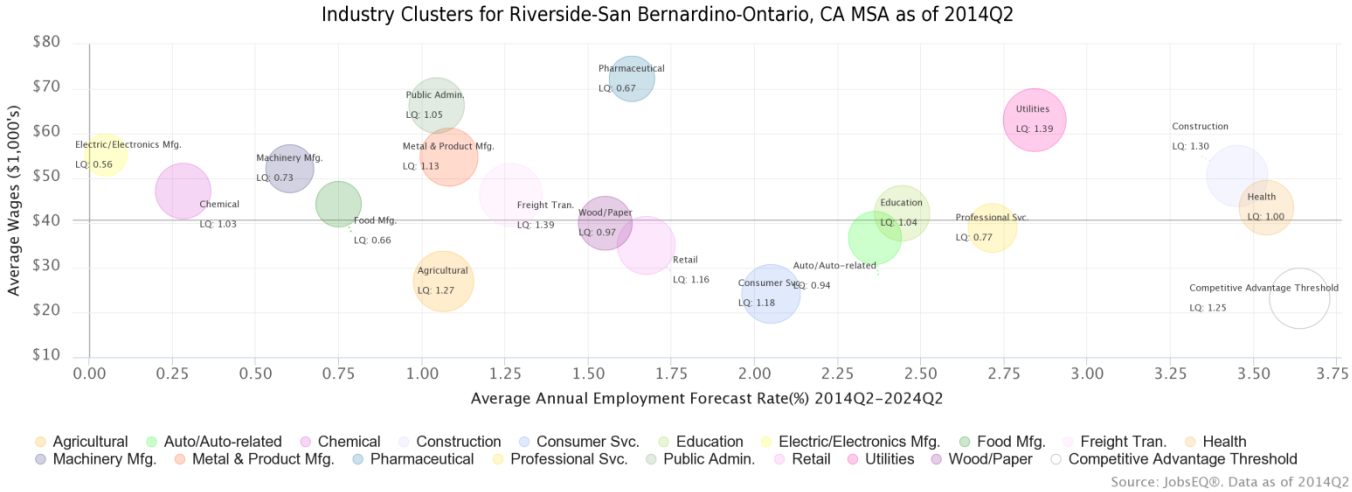
Figure 16: Industries with High Job-Creating Potential

		Current			Historical				Forecast		
		Four Quarters Ending with 2014q2			Total Change	Average Annual % Change in Employment 2011q2-2014q2			Over the Next 3 Years		
NAICS	Industry	Employ-ment	Average Annual Wages	LQ	3-Year Employ-ment	Riverside-San Bernardino-Ontario, CA MSA	CA	USA	Total Approx. Replace-ment Demand	Total Employ-ment Change	Average Annual Growth Percent
6241	Individual and Family Services	39,593	$11,142	2.04	33,414	85.7%	64.2%	13.8%	2,077	6,453	5.2%
6211	Offices of Physicians	28,317	$75,988	1.23	4,154	5.4%	2.6%	1.9%	1,721	2,940	3.3%
4411	Automobile Dealers	13,334	$56,137	1.25	2,115	5.9%	4.2%	3.8%	1,094	716	1.8%
4841	General Freight Trucking	17,799	$44,073	2.04	2,513	5.2%	3.7%	2.2%	1,037	692	1.3%
2382	Building Equipment Contractors	16,469	$51,279	1.01	3,174	7.4%	6.6%	2.8%	983	1,801	3.5%
2381	Foundation, Structure, and Building Exterior Contractors	13,639	$39,618	2.07	2,511	7.0%	6.2%	2.7%	831	1,433	3.4%
2383	Building Finishing Contractors	12,933	$36,271	2.09	3,319	10.4%	5.8%	2.4%	748	1,060	2.7%
6212	Offices of Dentists	9,544	$40,636	1.19	474	1.7%	2.1%	1.7%	607	1,008	3.4%
4244	Grocery and Related Product Merchant Wholesalers	8,141	$64,636	1.21	1,196	5.4%	1.6%	0.9%	563	513	2.1%
2361	Residential Building Construction	6,774	$46,471	1.16	1,483	8.6%	6.1%	3.7%	418	1,032	4.8%
2389	Other Specialty Trade Contractors	6,219	$48,151	1.22	418	2.3%	4.2%	2.4%	395	732	3.8%
2371	Utility System Construction	4,539	$76,667	1.11	665	5.4%	7.5%	4.6%	306	498	3.5%
4239	Miscellaneous Durable Goods Merchant Wholesalers	4,074	$38,935	1.46	927	9.0%	1.0%	2.4%	297	368	2.9%
4881	Support Activities for Air Transportation	2,518	$44,033	1.27	689	11.2%	4.4%	1.5%	201	241	3.1%
4854	School and Employee Bus Transportation	2,787	$27,431	1.24	328	4.3%	1.9%	1.1%	191	216	2.5%
4237	Hardware, and Plumbing and Heating Equipment and Supplies Merchant Wholesalers	2,665	$54,089	1.25	286	3.9%	1.4%	1.7%	181	159	2.0%
6239	Other Residential Care Facilities	1,902	$30,448	1.19	25	0.4%	-2.4%	-0.1%	139	179	3.0%
2379	Other Heavy and Civil Engineering Construction	1,220	$82,370	1.27	434	15.8%	5.4%	2.9%	79	90	2.4%
4889	Other Support Activities for Transportation	662	$39,602	2.28	360	29.9%	13.2%	3.3%	50	49	2.4%
4882	Support Activities for Rail Transportation	313	$35,660	1.10	224	51.9%	19.3%	8.9%	25	26	2.7%

Source: JobsEQ®

In Chmura's long-run growth model, the Inland Empire has four industry clusters that are likely to expand employment in excess of 2.5% per year over the next decade. These industries—utilities, professional services, healthcare, and construction—represent almost one-third of the total employment in the region and are likely to expand faster than the overall pace of job growth in California.

Figure 17: Riverside-San Bernardino-Ontario, CA MSA Industrial Clusters (scaled by employment)



Workforce Alignment Analysis and Outlook

Over the next ten years, job growth in the Inland Empire is expected to be reasonably balanced with greater than 2% annual expansions across job cohorts, regardless of educational requirements. Fast growth is expected for jobs requiring very little education to those typically requiring extensive postsecondary education. While the relatively strong growth rates for jobs requiring a high school diploma or less is at odds with state trends—which is seeing more of a skill-bias in job creation—the region's average annual wages and unemployment rates by education level mirror the norms of the state and the nation.

Figure 18: Employment Growth by Education Level

	Regional Employment Q2 2014	Average Annual Salary Q2 2014	Average Annual Growth Rate Next 10 Years
Postgraduate	46,429	$98,300	2.7%
Bachelor's degree	162,591	$ 74,700	2.5%
2-Year degree or certificate	113,332	$ 64,900	2.6%
Previous work experience, no award	134,087	$ 49,300	2.1%
Long-term training, no exp, no award	59,399	$ 50,600	2.5%
Moderate-term OJT, no exp, no award	174,506	$ 42,400	2.1%
Short-term OJT, no exp, no award	552,335	$26,800	2.1%

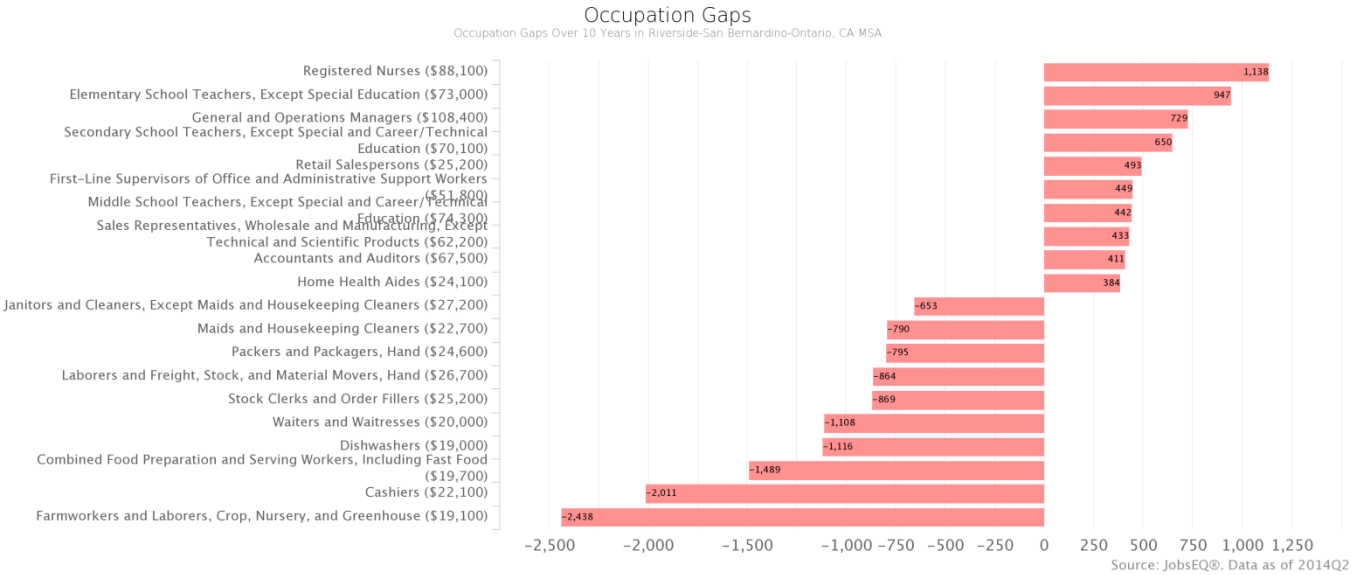
Source: JobsEQ®

High-Level Workforce Alignment Metrics

Estimated occupational deficits over the next ten years are likely to vary across the Inland Empire in terms of the level of education required. The majority of the occupations (at the 6-digit SOC code level) with the highest projected gaps over the next ten years will require some postsecondary education. Many of these occupations are likely to require specific training in a medical or healthcare field. In the case of gaps related to positions that require only short-term on-the-job training, it is likely that the Inland Empire economy will not suffer from widespread skill-shortages, but rather the need to facilitate the transition of workers from some of its declining industries—such as

low-value-added food service industries—into the higher-level service sector jobs that are likely to be growing rapidly over the next decade—such as home-health aides as shown in the chart below.

Figure 19: Inland Empire Long-Run Potential Occupational Gap



At the major occupation group level (2-digit SOC), the Inland Empire has a shortfall in the number of awards (graduates) by the region's postsecondary schools. This is not uncommon but can be particularly challenging, especially for areas with below-average postsecondary educational attainment. Taking into account the size of the regional economy and the industry mix of the area, the Inland Empire region falls short in the number of recent postsecondary awards across several major occupational groups. For example, in the 2012-2013 academic year, 3,862 awards were produced by postsecondary schools in the Inland Empire region related to occupations in the business and financial operations field. Given the region's current employment in these occupations, however, this award production fell short of the national norm relative to the number employed in the region by 1,145 awards. Likewise, award production in the Inland Empire region fell short by 358 awards related to architectural and engineering occupations and was short by 3,182 awards for education, training, and library occupations. In other words, for the region to maintain a properly trained employment base, new workers for these occupations would need to be "imported" from schools outside the region. This "import" of trained individuals includes residents of the area who may have moved outside the region to be educated and then move back for employment once their studies are completed.

Figure 20: Broad-Level Educational Alignment Analysis

Occupation	2014Q2 Employment	Awards (2012-2013)	Training Concentration[1]		Short-Run Supply & Demand Analysis	Max Annual Shortfall
Management	44,719	5,753	118%	↔	Equilibrium	-
Business and Financial Operations	43,247	659	36%	⬇	Under-Supply	1,145
Computer and Mathematical	19,226	786	89%	⬇	Under-Supply	98
Architecture and Engineering	11,179	489	58%	⬇	Under-Supply	358
Life, Physical, and Social Science	6,671	890	87%	⬇	Under-Supply	129
Community and Social Service	21,735	1,803	67%	⬇	Under-Supply	879
Legal	5,701	219	56%	⬇	Under-Supply	171
Education, Training, and Library	83,094	6,616	68%	⬇	Under-Supply	3,182
Arts, Design, Entertainment, Sports, and Media	10,883	1,444	89%	⬇	Under-Supply	177
Healthcare Practitioners and Technical	59,115	4,082	100%	↔	Equilibrium	-

Source: JobsEQ®

[1] Training concentration is the comparison of the local rate of degree production to the national average. 100% is equal to the average rate of degree production in the nation for a particular occupation. For example, 110% is 10% above average, 50% is half the national average, and so on.

Key Occupations

Chmura identified key occupations that generally require an associate's degree or postsecondary non-degree award as typical education for entry. Only occupations with average annual wages near or above the Inland Empire's average are included in this analysis. The occupations were ordered by total annual demand. In addition, the average annual growth rate over the next three years is included to help identify occupations that are expected to have the fastest employment growth over this period in the Inland Empire. Finally, Science, Technology, Engineering, and Mathematics (STEM) occupations were identified; these jobs typically pay relatively high wages and many do not require a bachelor's degree.

Relevant factors:[10]

Average Annual Wages: This factor identifies occupations with wages near or above the region's average annual wage of $40,711. The average annual wage for the Inland Empire is close to the living wage for San Bernardino County.[11]

STEM: This factor identifies jobs classified as STEM occupations based on a definition from the U.S. Department of Commerce.

[10] A complete definition of the data utilized in this section is in the appendix.

[11] Based on Massachusetts Institute of Technology's Living Wage Calculator, the living wage for the county varies from $10.72/hour (roughly $22,000 per year) for a one adult household to $31.42/hour (about $65,000 per year) for a household with one adult and three children. The living wage for a two adult, two child household Is $20.67/hour (approximately $43,000 per year). http://livingwage.mit.edu/counties/06071

This analysis yielded 74 occupations (44 occupations typically requiring an associate's degree for entry and 30 occupations typically requiring a postsecondary non-degree award) that pay wages near or above average (see Figures 21a and 21b).

21a and 21b: Occupations with Above Average Wages

The table below includes occupations with Associate's degrees as a typical entry-level education requirement; it is rank-ordered based on the "Total Annual Demand" column.

SOC	Title	Current Employ-ment	Average Annual Wages	Annual Replace-ment Demand	Total Annual Demand	Baseline Annual Supply Gap (or Surplus)	Minimum Previous Work Experience	Typical On-the-Job Training	Average Annual Growth Percent Over the Next Three Years	Unem-ployed	Unemploy-ment Rate	STEM[12]
29-1141	Registered Nurses	21,959	$88,100	452	1,114	1,138	None	None	2.7%	502	2.0%	
11-1021	General and Operations Managers	17,306	$108,400	349	786	729	1 to 5 years	None	2.3%	1121	5.1%	
11-9021	Construction Managers	2,106	$109,500	82	167	112	More than 5	None	3.4%	180	6.9%	
29-2021	Dental Hygienists	2,116	$89,300	58	156	147	None	None	3.9%	62	2.4%	
29-2034	Radiologic Technologists	1,680	$59,800	25	80	76	None	None	2.8%	54	2.7%	
23-2011	Paralegals and Legal Assistants	1,316	$53,200	23	63	38	None	None	2.6%	175	8.1%	
43-4061	Eligibility Interviewers, Government Programs	1,194	$40,700	26	56	32	None	Moderate-term on-the-job training	2.2%	155	10.6%	
29-1126	Respiratory Therapists	926	$67,900	14	41	41	None	None	2.6%	30	2.8%	
29-2032	Diagnostic Medical Sonographers	513	$69,700	8	39	38	None	None	4.8%	17	2.7%	
31-2021	Physical Therapist Assistants	509	$64,400	12	38	36	None	None	4.2%	32	4.9%	
15-1134	Web Developers	573	$64,100	12	31	29	1 to 5 years	None	2.9%	37	4.2%	
17-3023	Electrical and Electronic Engineering Technicians	821	$63,800	18	29	23	None	None	1.2%	71	5.5%	✓

[12] Based on the U.S. Department of Commerce, Economic and Statistics Administration's definition. http://www.esa.doc.gov/sites/default/files/reports/documents/stemfinaljuly14.pdf

SOC	Title	Current Employ-ment	Average Annual Wages	Annual Replace-ment Demand	Total Annual Demand	Baseline Annual Supply Gap (or Surplus)	Minimum Previous Work Experience	Typical On-the-Job Training	Average Annual Growth Percent Over the Next Three Years	Unem-ployed	Unemploy-ment Rate	STEM[12]
49-9062	Medical Equipment Repairers	338	$57,300	12	28	23	None	Moderate-term on-the-job training	4.0%	16	3.6%	
29-2031	Cardiovascular Technologists and Technicians	431	$54,200	7	25	24	None	None	3.7%	12	2.4%	
19-4099	Life, Physical, and Social Science Technicians, All Other	388	$58,300	16	25	13	None	Moderate-term on-the-job training	2.0%	59	10.6%	✓
19-4091	Environmental Science and Protection Technicians, Including Health	253	$45,000	11	19	11	None	Moderate-term on-the-job training	2.7%	37	10.5%	✓
31-2011	Occupational Therapy Assistants	226	$63,800	6	18	18	None	None	4.3%	8	2.9%	
19-4031	Chemical Technicians	347	$41,200	9	17	12	None	Moderate-term on-the-job training	2.0%	42	8.2%	✓
19-4093	Forest and Conservation Technicians	296	$41,700	13	16	1	None	None	0.7%	58	15.5%	✓
17-3026	Industrial Engineering Technicians	431	$51,400	11	15	11	None	None	1.0%	32	4.9%	✓
17-3022	Civil Engineering Technicians	504	$65,200	11	15	12	None	None	0.8%	46	6.6%	✓
17-3029	Engineering Technicians, Except Drafters, All Other	428	$66,000	9	15	12	None	None	1.2%	37	6.0%	✓
53-2021	Air Traffic Controllers	230	$126,700	11	14	8	None	Long-term on-the-job training	1.4%	16	5.9%	
17-3011	Architectural and Civil Drafters	566	$54,900	8	14	13	None	None	1.0%	45	5.6%	✓

SOC	Title	Current Employ-ment	Average Annual Wages	Annual Replace-ment Demand	Total Annual Demand	Baseline Annual Supply Gap (or Surplus)	Minimum Previous Work Experience	Typical On-the-Job Training	Average Annual Growth Percent Over the Next Three Years	Unem-ployed	Unemploy-ment Rate	STEM[12]
29-2035	Magnetic Resonance Imaging Technologists	269	$77,900	4	13	13	None	None	3.1%	9	2.7%	
17-3013	Mechanical Drafters	416	$59,000	8	12	8	None	None	0.7%	28	4.8%	✓
17-3027	Mechanical Engineering	253	$47,500	6	10	8	None	None	1.6%	20	5.2%	✓
29-1124	Radiation Therapists	149	$87,900	3	8	8	None	None	3.0%	7	3.7%	
29-2033	Nuclear Medicine	174	$95,800	3	8	8	None	None	2.8%	5	2.5%	
39-4031	Morticians, Undertakers, and Funeral Directors	157	$65,300	4	8	8	None	Apprenticeship	2.3%	15	7.0%	
19-4061	Social Science Research Assistants	102	$46,300	4	7	3	None	None	2.6%	17	9.9%	
17-3012	Electrical and Electronics Drafters	193	$55,600	3	7	7	None	None	2.1%	16	5.7%	✓
17-3025	Environmental Engineering Technicians	126	$45,600	3	7	6	None	None	2.7%	10	5.5%	✓
27-4012	Broadcast Technicians	129	$46,300	3	5	2	None	Short-term on-the-job training	1.7%	28	10.7%	
17-3019	Drafters, All Other	125	$52,800	2	5	5	None	None	2.3%	10	5.9%	✓
49-9069	Precision Instrument and Equipment Repairers, All Other	93	$51,900	3	5	3	None	Long-term on-the-job training	1.6%	5	4.3%	
29-2054	Respiratory Therapy Technicians	96	$53,800	1	4	3	None	Moderate-term on-the-job training	2.5%	4	3.1%	
19-4051	Nuclear Technicians	56	$75,100	2	4	1	None	Moderate-term on-the-job training	2.4%	4	5.5%	✓
17-3024	Electro-Mechanical Technicians	79	$53,100	2	3	2	None	None	1.5%	7	5.6%	✓
11-9061	Funeral Service Managers	57	$63,100	1	3	3	None	Apprenticeship	2.4%	3	3.6%	

SOC	Title	Current Employ-ment	Average Annual Wages	Annual Replace-ment Demand	Total Annual Demand	Baseline Annual Supply Gap (or Surplus)	Minimum Previous Work Experience	Typical On-the-Job Training	Average Annual Growth Percent Over the Next Three Years	Unem-ployed	Unemploy-ment Rate	STEM[12]
19-4041	Geological and Petroleum Technicians	42	$52,900	2	3	1	None	Moderate-term on-the-job training	2.3%	8	11.4%	✓
43-9031	Desktop Publishers	71	$45,400	2	3	1	None	Short-term on-the-job training	1.1%	10	9.3%	
17-3021	Aerospace Engineering and Operations	47	$63,300	1	2	(0)	None	None	1.2%	5	4.8%	✓
49-9061	Camera and Photographic Equipment Repairers	26	$43,700	1	1	1	None	Long-term on-the-job training	1.7%	1	3.9%	

Source: JobsEQ®
Data as of 2014Q2

The table below includes occupations with Postsecondary non-degree awards as a typical entry-level education requirement; it is rank-ordered based on the "Total Annual Demand" column.

SOC	Title	Current Employ-ment	Average Annual Wages	Annual Replace-ment Demand	Total Annual Demand	Baseline Annual Supply Gap (or Surplus)	Minimum Previous Work Experience	Typical On-the-Job Training	Average Annual Growth Percent Over the Next Three Years	Unem-ployed	Unemploy-ment Rate	STEM
29-2061	Licensed Practical and Licensed Vocational Nurses	5,782	$46,100	150	357	198	None	None	3.1%	348	4.8%	
33-2011	Firefighters	3,548	$58,500	103	167	93	None	Long-term on-the-job training	1.7%	357	8.0%	
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	2,372	$48,900	70	155	83	None	Long-term on-the-job training	3.1%	247	7.9%	
51-1011	First-Line Supervisors of Production and Operating	4,753	$52,000	82	144	38	1 to 5 years	None	1.2%	349	5.5%	
29-2071	Medical Records and Health Information Technicians	1,556	$43,400	44	96	40	None	None	2.9%	139	6.9%	
49-2022	Telecommunications Equipment Installers and Repairers, Except Line Installers	1,488	$58,200	23	52	41	None	Moderate-term on-the-job training	1.8%	112	5.6%	
31-9011	Massage Therapists	655	$45,300	14	46	38	None	None	4.1%	58	6.7%	
33-1021	First-Line Supervisors of Fire Fighting and Prevention Workers	720	$101,800	33	46	23	1 to 5 years	None	1.7%	20	2.3%	
49-3011	Aircraft Mechanics and Service Technicians	914	$61,700	27	44	27	None	None	1.8%	32	2.5%	
29-2055	Surgical Technologists	835	$49,300	9	44	25	None	None	3.6%	36	3.5%	

SOC	Title	Current Employ-ment	Average Annual Wages	Annual Replace-ment Demand	Total Annual Demand	Baseline Annual Supply Gap (or Surplus)	Minimum Previous Work Experience	Typical On-the-Job Training	Average Annual Growth Percent Over the Next Three Years	Unem-ployed	Unemploy-ment Rate	STEM
29-2099	Health Technologists and Technicians, All Other	716	$41,600	8	36	23	None	Short-term on-the-job training	3.3%	38	4.3%	
31-9094	Medical Transcriptionists	559	$46,100	12	22	11	None	None	1.6%	25	3.6%	
27-4011	Audio and Video Equipment Technicians	363	$42,500	8	20	11	None	Moderate-term on-the-job training	2.8%	69	10.2%	
49-2094	Electrical and Electronics Repairers, Commercial and Industrial Equipment	505	$56,100	11	20	15	None	Long-term on-the-job training	1.6%	40	5.8%	
29-2053	Psychiatric Technicians	831	$57,400	8	16	(6)	None	Short-term on-the-job training	0.8%	35	3.8%	
53-2012	Commercial Pilots	247	$70,500	8	14	11	None	None	2.3%	8	2.7%	
49-2097	Electronic Home Entertainment Equipment Installers and Repairers	249	$43,500	11	14	1	None	None	1.2%	27	8.2%	
49-2095	Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	182	$79,700	4	6	4	None	Long-term on-the-job training	1.2%	10	4.4%	
49-2091	Avionics Technicians	126	$72,400	3	5	4	None	None	1.9%	9	4.6%	
23-2091	Court Reporters	141	$82,600	3	5	5	None	Short-term on-the-job training	1.7%	13	7.1%	
49-2092	Electric Motor, Power Tool, and Related Repairers	169	$44,900	4	5	0	None	Long-term on-the-job training	0.7%	15	6.6%	
49-9092	Commercial Divers	39	$77,200	1	3	(4)	None	Moderate-term on-the-job training	3.8%	7	11.8%	

SOC	Title	Current Employ-ment	Average Annual Wages	Annual Replace-ment Demand	Total Annual Demand	Baseline Annual Supply Gap (or Surplus)	Minimum Previous Work Experience	Typical On-the-Job Training	Average Annual Growth Percent Over the Next Three Years	Unem-ployed	Unemploy-ment Rate	STEM
49-2093	Electrical and Electronics Installers and Repairers, Transportation Equipment	72	$55,500	2	3	2	None	Long-term on-the-job training	1.4%	5	5.3%	
29-2092	Hearing Aid Specialists	51	$49,800	1	2	2	None	Short-term on-the-job training	3.2%	3	4.8%	
27-4014	Sound Engineering Technicians	59	$58,400	1	2	2	None	Short-term on-the-job training	1.7%	15	8.6%	
13-1032	Insurance Appraisers, Auto Damage	60	$58,000	2	2	1	None	Moderate-term on-the-job training	0.6%	4	4.7%	
49-9045	Refractory Materials Repairers, Except Brickmasons	23	$45,500	1	1	0	None	Moderate-term on-the-job training	1.1%	1	3.2%	
39-4011	Embalmers	29	$41,300	1	1	(0)	None	Short-term on-the-job training	-0.4%	8	16.9%	
49-9097	Signal and Track Switch Repairers	14	$58,500	0	1	0	None	Moderate-term on-the-job training	1.1%	2	8.3%	
39-5091	Makeup Artists, Theatrical and Performance	15	$73,000	0	0	(0)	None	None	1.9%	2	3.4%	

Source: JobsEQ®
Data as of 2014Q2

22a and 22b: Licenses/Certifications Required for Occupations with Above Average Wages

The table below includes license/certification requirements for occupations with Associate's degrees as a typical entry-level education requirement; it is rank-ordered based on the "Total Annual Demand" column.

SOC	Title	Total Annual Demand	Licenses (State)	Certifications (National)	Credentials Link
29-1141	Registered Nurses	1,114	Nurse, Registered; Public Health Nurse; School Nurse Services Credential	156 in areas including Acute Care Nurse Practitioner (Adult); Certified Pediatric Nurse Practitioner--Primary Care; Clinical Nurse Leader; and Assisted Living Nurse Specialty	http://www.onetonline.org/link/summary/29-1141.00#Education
11-1021	General and Operations Managers	786	N/A	121 in areas including Certified Cost Technician; Energy Efficiency Management; Certified Construction Manager; Project Manager E-Business; and company specific certifications (IBM, Microsoft, Oracle, etc.)	http://www.onetonline.org/link/summary/11-1021.00#Education
11-9021	Construction Managers	167	14 licenses including Building/Moving/Demolition Contractor; General Building Contractor; Masonry Contractor; and Low Voltage Systems Contractor	67 in areas including Certified Healthcare Constructor; Certified Welding Supervisor; LEED Green Associate; and Construction Site Safety Supervisor	http://www.onetonline.org/link/summary/11-9021.00#Education
29-2021	Dental Hygienists	156	Dental Hygienist - Extended Functions; Dental Hygienist, Registered; Registered Dental Hygienists in Alternative Practice (RDHAP)	Certified Dental Technician; Board Certified in Biofeedback	http://www.onetonline.org/link/summary/29-2021.00#Education
29-2034	Radiologic Technologists	80	California Radiologic Technologist (CRT)	32 in areas including Critical Care Ultrasonography; Certification in Magnetic Resonance Imaging Physics; Certified EKG Technician; and Registered Technologist.	http://www.onetonline.org/link/summary/29-2034.00#Education
23-2011	Paralegals and Legal Assistants	63	N/A	14 in areas such as Certified Paralegal; GAIC Legal Issues; Professional Paralegal; Certified Divorce Financial Analyst; and Advanced Paralegal Certification	http://www.onetonline.org/link/summary/23-2011.00#Education

SOC	Title	Total Annual Demand	Licenses (State)	Certifications (National)	Credentials Link
43-4061	Eligibility Interviewers, Government Programs	56	N/A	Certified Housing Counselor; Fair Housing Compliance; Certified Specialist of Occupancy - Housing Choice Voucher	http://www.onetonline.org/link/summary/43-4061.00#Education
29-1126	Respiratory Therapists	41	Respiratory Care Practitioner	Certified Respiratory Therapist; Registered Respiratory Therapist; Certificate of Completion: Bronchoscopy; Infection Control Certifications; Adult Critical Care Specialty; Neonatal/Pediatric Respiratory Care Specialist; Sleep Disorders Testing and Therapeutic Intervention Respiratory Care Specialist; Certified Hyperbaric Technologist; Certificate of Added Qualification in Neonatal Pediatric Transport	http://www.onetonline.org/link/summary/29-1126.00#Education
29-2032	Diagnostic Medical Sonographers	39	N/A	28 including Certificate of Completion - Critical Care Ultrasonography; Registered Technologist (multiple specialties); Registered Radiologist Assistant; and Registered Diagnostic Medical Sonographer (multiple specialties)	http://www.onetonline.org/link/summary/29-2032.00#Education
31-2021	Physical Therapist Assistants	38	Physical Therapist Assistant	Occupational Therapist Registered; Certification in Orthopedic Manual Therapy; Functional Training Specialty Certification; Orthopedic Exercise Specialty Certification; Wound Care Certified; Orthopaedic Technologist Certified	http://www.onetonline.org/link/summary/31-2021.00#Education
15-1134	Web Developers	31	N/A	139 including Web Application Developer Associate 10.2; CIW Web Design Specialist; Site Development Associate; CIW E-Commerce Specialist; Certified Usability Analyst; and Certified Internet Webmaster	http://www.onetonline.org/link/summary/15-1134.00#Education
17-3023	Electrical and Electronic Engineering Technicians	29	N/A	29 including Certified Quality Technician; Certified Technology Manager; Industrial Electronics; ISA Certified Control Systems Technician; and Senior Telecommunications Technician	http://www.onetonline.org/link/summary/17-3023.00#Education

SOC	Title	Total Annual Demand	Licenses (State)	Certifications (National)	Credentials Link
49-9062	Medical Equipment Repairers	28	N/A	Biomedical Imaging Electronic Technician; Certified Biomedical Equipment Technician; Certified Laboratory Equipment Specialist; Certified Radiology Equipment Specialist; Certified Electronics Technician - Journeyman-Level - Medical; and Certified Laser Repair Technician	http://www.onetonline.org/link/summary/49-9062.00#Education
29-2031	Cardiovascular Technologists and Technicians	25	N/A	20 including Clinical Research Assistant; EKG Technician; Certified EKG Technician; Registered Pulmonary Function Technologist; and Certified Cardiographic Technician	http://www.onetonline.org/link/summary/29-2031.00#Education
19-4099	Life, Physical, and Social Science Technicians, All Other	25	N/A	23 including Certified Remote Sensing Technologist; ArcGIS Desktop Developer; Web Application Developer Associate; Certified Quality Improvement Associate; Certified Quality Technician; and Certified Indoor Air Quality Manager	http://www.onetonline.org/link/summary/19-4099.00#Education
19-4091	Environmental Science and Protection	19	Asbestos Consultant Certification	75 including Wastewater Lab Analyst; Certified Safety Profession; Certified Hazardous Materials Practitioner; and Environmental Analytical Technician	http://www.onetonline.org/link/summary/19-4091.00#Education
31-2011	Occupational Therapy Assistants	18	Occupational Therapy Assistant	11 including Certified Occupational Therapy Assistant; Occupational Therapist Registered; Functional Training Specialty Certification; and Assistive Technology Professional	http://www.onetonline.org/link/summary/31-2011.00#Education
19-4031	Chemical Technicians	17	N/A	21 including Concrete Field Testing Technician; Wastewater Lab Analyst; Clinical Chemical Technologist; Registered Hazardous and Chemical Materials Manager; and Approved Chemist	http://www.onetonline.org/link/summary/19-4031.00#Education
19-4093	Forest and Conservation Technicians	16	Certified Rangeland Manager (CRM)	Certified Forestor; Forest Certification Auditor	http://www.onetonline.org/link/summary/19-4093.00#Education

SOC	Title	Total Annual Demand	Licenses (State)	Certifications (National)	Credentials Link
17-3026	Industrial Engineering Technicians	15	N/A	29 Certifications including Certified Quality Process Analyst; Certified in Engineering Graphics; Data Center Design Consultant; ISA Certified Control Systems Technician; and certified Manufacturing Engineer	http://www.onetonline.org/link/summary/17-3026.00#Education
17-3022	Civil Engineering Technicians	15	N/A	45 including Certification in Construction Materials Testing; Corrosion Technician; Geotechnical Engineering Technology; and Healthcare Facility Design Professional	http://www.onetonline.org/link/summary/17-3022.00#Education
17-3029	Engineering Technicians, Except Drafters, All Other	15	N/A	78 including Certified Reliability Engineer; Traffic Signal Design/Engineering Technician; Associate Engineering Technologist; and Electric Vehicle Technician	http://www.onetonline.org/link/summary/17-3029.00#Education
53-2021	Air Traffic Controllers	14	N/A	Professional Traffic Operations Engineer	http://www.onetonline.org/link/summary/53-2021.00#Education
17-3011	Architectural and Civil Drafters	14	N/A	Architectural Apprentice Drafter; Data Center Design Consultant; High=Performance Building Design; LEED AP Homes; LEED AP Interior Design & Construction; LEED AP Neighborhood Development; Certified Professional Building Designer	http://www.onetonline.org/link/summary/17-3011.00#Education
29-2035	Magnetic Resonance Imaging Technologists	13	N/A	17 including Certification in Magnetic Resonance Imaging Physics; Registered Technologist - Magnetic Resonance Imaging; Registered Technologist - Bone Densitometry; and Certification in Medical Health Physics	http://www.onetonline.org/link/summary/29-2035.00#Education
17-3013	Mechanical Drafters	12	N/A	Mechanical Apprentice Drafter; Mechanical Certified Drafter; LEED Green Associate; Geometric Dimensioning & Tolerancing Professional - Technologist; IAPMO Mechanical Plans Examiner	http://www.onetonline.org/link/summary/17-3013.00#Education

SOC	Title	Total Annual Demand	Licenses (State)	Certifications (National)	Credentials Link
17-3027	Mechanical Engineering Technicians	10	N/A	17 including Certified Quality Technician; Certified Systems Engineering Professional; PMMI Mechatronics: Mechanical Components; Fluid Power Master Technician; and Certified Automation Professional	http://www.onetonline.org/link/summary/17-3027.00#Education
29-1124	Radiation Therapists	8	N/A	11 Including Registered Technologist - Radiography; Certified Medical Dosimetrist; Registered Technologist - Radiation; and Nuclear Cardiology Technologist	http://www.onetonline.org/link/summary/29-1124.00#Education
29-2033	Nuclear Medicine Technologists	8	Nuclear Medicine Technologist (NMT)	20 including Certified Nuclear Medicine Technologist; Certified in Nuclear Medicine; and Nuclear Medicine Advanced Associate	http://www.onetonline.org/link/summary/29-2033.00#Education
39-4031	Morticians, Undertakers, and Funeral Directors	8	Cemetary Manager; Crematory Manager; Funeral Director	Certified Funeral Service Practitioner	http://www.onetonline.org/link/summary/39-4031.00#Education
19-4061	Social Science Research Assistants	7	N/A	Certified GIS/LIS Technologist; Zoning Inspector; Certified Planner; LEED AP Neighborhood Development; Certified Collection Systems - Manager; Professional Transportation Planner	http://www.onetonline.org/link/summary/19-4061.00#Education
17-3012	Electrical and Electronics Drafters	7	N/A	Certified Interconnect Designer; IPC-A-600 Acceptability of Printed Circuit Boards; Advanced Certified Interconnect Designer	http://www.onetonline.org/link/summary/17-3012.00#Education
17-3025	Environmental Engineering Technicians	7	N/A	44 including Water Lab Analyst; Board Certified Environmental Engineer - Environmental Sustainability; Geotechnical Engineering Technology; and Registered Environmental Technician	http://www.onetonline.org/link/summary/17-3025.00#Education
27-4012	Broadcast Technicians	5	N/A	15 including Certified Broadcast Networking Technologist; Certified Broadcast Radio Engineer; Certified Video Engineer; and Certified Audio Engineer	http://www.onetonline.org/link/summary/27-4012.00#Education
17-3019	Drafters, All Other	5	N/A	N/A	http://www.onetonline.org/link/summary/17-3019.00#Education

SOC	Title	Total Annual Demand	Licenses (State)	Certifications (National)	Credentials Link
49-9069	Precision Instrument and Equipment Repairers, All Other	5	N/A	N/A	http://www.onetonline.org/link/summary/49-9069.00#Education
29-2054	Respiratory Therapy Technicians	4	N/A	Certificate of Completion - Mechanical Ventilation; Adult Critical Care Specialty; Sleep Disorders Testing and Therapeutic Intervention Respiratory Care Specialist	http://www.onetonline.org/link/summary/29-2054.00#Education
19-4051	Nuclear Technicians	4	N/A	Registered Radiation Protection Technologist; NDE/QC Personnel Certification; Industrial Radiography Radiation Safety Personnel - Radioactive Materials/ X-Ray/ Personnel	http://www.onetonline.org/link/summary/19-4051.00#Education
17-3024	Electro-Mechanical Technicians	3	N/A	13 including Certified Robotic Arc Welding Operator; Certified Quality Technician; ISA Certified Control Systems Technician; Fluid Power Mobile Hydraulic Technician; and Unmanned Systems Aircraft Maintenance	http://www.onetonline.org/link/summary/17-3024.00#Education
11-9061	Funeral Service Managers	3	Cemetery Manager; Crematory Manager	Certified Preplanning Consultant; Certified Funeral Service Practitioner; Certified in Thanatology; Fellow in Thanatology	http://www.onetonline.org/link/summary/11-9061.00#Education
19-4041	Geological and Petroleum Technicians	3	N/A	20 including Registered Landman; Certified Coal Geologist; Certified Petroleum Geophysicist; and ACSM - THSOA Certified Hydrographer	http://www.onetonline.org/link/summary/19-4041.00#Education
43-9031	Desktop Publishers	3	N/A	17 including Certified Medical Publication Professional; Excel 2007 Expert; Adobe Acrobat XI Pro; and Microsoft Word 2010	http://www.onetonline.org/link/summary/43-9031.00#Education
17-3021	Aerospace Engineering and Operations Technicians	2	N/A	19 including Certified Calibration Technician; Certification in Aerospace Physiology; Geometric Dimensioning & Tolerancing Profession - Technologist; and Certified Aerospace Technician	http://www.onetonline.org/link/summary/17-3021.00#Education
49-9061	Camera and Photographic	1	N/A	N/A	http://www.onetonline.org/link/summary/49-9061.00#Education

Source: JobsEQ® and O*NET
Data as of 2014Q2

The table below includes licenses/certification requirements for occupations with Postsecondary non-degree awards as a typical entry-level education requirement; it is rank-ordered based on the "Total Annual Demand" column.

SOC	Title	Total Annual Demand	Licenses (State)	Certifications (National)	Credentials Link
29-2061	Licensed Practical and Licensed Vocational Nurses	357	Licensed Vocational Nurse	27 including Point-of-Care Technician; LPN in Long Term Care Certification; Certification in Assisted Living Nursing; and IV Therapy	http://www.onetonline.org/link/summary/29-2061.00#Education
33-2011	Firefighters	167	N/A	Health & Safety Officer Certification; First Responder; WSO - Certified Hazardous Materials Technician; Sartech; Incident Safety Officer - Fire Suppression Certification; Certified Fire Protection Specialist	http://www.onetonline.org/link/summary/33-2011.00#Education
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	155	Refrigeration Contractor; Solar Contractor; Warm-Air Heating, Ventilating and Air-Conditioning Contractor	33 including Combustion Analysis Certification; Journeyman Air Condition & Refrigeration; Solar Thermal Installer Certification; and HVAC Master Specialist	http://www.onetonline.org/link/summary/49-9021.00#Education
51-1011	First-Line Supervisors of Production and Operating Workers	144	N/A	22 including Certified Welding Inspector; Certified Technology Manager; Certified Plant Supervisor; Certified Supply Chain Professional; and Concrete Construction Special Inspector	http://www.onetonline.org/link/summary/51-1011.00#Education
29-2071	Medical Records and Health Information Technicians	96	N/A	67 including Certified Professional Coder; Certified Health Data Analyst; Registered Medical Transcriptionist; and Specialty Coding Professional	http://www.onetonline.org/link/summary/29-2071.00#Education
49-2022	Telecommunications Equipment Installers and Repairers, Except Line Installers	52	N/A	29 including Mobile Product Specialist; Cable Splicing Certification; Data Cabling Installer; and Wireless Installer Engineer Certification	http://www.onetonline.org/link/summary/49-2022.00#Education
31-9011	Massage Therapists	46	N/A	Massage Therapy Certification; Board Certification in Therapeutic Massage and Bodywork; Medical Exercise Specialist; National Reflexology Certification; Diplomate in Asian Bodywork Therapy; Zero Balancing Certification	http://www.onetonline.org/link/summary/31-9011.00#Education

SOC	Title	Total Annual Demand	Licenses (State)	Certifications (National)	Credentials Link
33-1021	First-Line Supervisors of Fire Fighting and Prevention Workers	46	N/A	Fire Plans Examiner; Certified Fire Protection Specialist; Health & Safety Officer Certification; Certified Fire Marshall	http://www.onetonline.org/link/summary/33-1021.00#Education
49-3011	Aircraft Mechanics and Service Technicians	44	N/A	12 including Aerospace/Aircraft Assembly Maintenance Certification; Fluid Power Master Mechanic; Aircraft	http://www.onetonline.org/link/summary/49-3011.00#Education
29-2055	Surgical Technologists	44	N/A	13 including Certified Surgical Assistant; Certified Surgical Instrument Processor; Tech in Surgery - Certified; and Certified Medical-Surgical Registered Nurse	http://www.onetonline.org/link/summary/29-2055.00#Education
29-2099	Health Technologists and Technicians, All	36	Certified Hemodialysis Technician	Certified Hemodialysis Technologist/Technician; Certified Opthalmic Medical Technologist; National Contact Lens	http://www.onetonline.org/link/summary/29-2099.00#Education
31-9094	Medical Transcriptionists	22	N/A	Medical Administrative Specialist; Registered Medical Assistant; Certified Medical Transcriptionist; Registered	http://www.onetonline.org/link/summary/31-9094.00#Education
27-4011	Audio and Video Equipment Technicians	20	N/A	23 including Audio Systems; Certified Technology Specialist; Commercial Audio Technician; Video Security Systems Technician; and Certified Engineering Technician -	http://www.onetonline.org/link/summary/27-4011.00#Education
49-2094	Electrical and Electronics Repairers, Commercial and Industrial Equipment	20	N/A	29 including Certified Calibration Technician; Line and Antenna Sweeping; IPC-A-610 Acceptability of Electronics Assemblies Certification; ISA Certified Control Systems Technician; and Fiber Optics Technician	http://www.onetonline.org/link/summary/49-2094.00#Education
29-2053	Psychiatric Technicians	16	Psychiatric Technician	Nationally Certified Psychiatric Technician; Family Psychiatric & Mental Health Nurse Practitioner; Board Certified in Neurofeedback; Technician Certification in Biofeedback; Technician Certification in Neurofeedback; Certified Hypnotist; Certified Psychiatric Rehabilitation Practitioner	http://www.onetonline.org/link/summary/29-2053.00#Education
53-2012	Commercial Pilots	14	Pest Control Aircraft Pilot Certificate	Certified Instructor	http://www.onetonline.org/link/summary/53-2012.00#Education

SOC	Title	Total Annual Demand	Licenses (State)	Certifications (National)	Credentials Link
49-2097	Electronic Home Entertainment Equipment Installers and Repairers	14	N/A	ITS Design Fundamentals; Certified Electronics Systems Technician; Associate CET Senior; Certified Electronics Systems Associate; Wireless Systems Installer Technician; Certified Engineering Technician - Audio Systems; Certified Satellite Installer; Wireless Systems Installer Engineer; Certified Electronics Technician - Consumer/ Multimedia Systems Technician.	http://www.onetonline.org/link/summary/49-2097.00#Education
49-2095	Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	6	N/A	Cable Splicing Certification; Instrumentation Certification; OCAT Technician; System Operator Certification	http://www.onetonline.org/link/summary/49-2095.00#Education
49-2091	Avionics Technicians	5	N/A	Avionics Electronics Technician; RADAR Electronics Technician; Aircraft Electronics Technician; Certified Aerospace Technician; Certified Electronic Technician	http://www.onetonline.org/link/summary/49-2091.00#Education
23-2091	Court Reporters	5	Certified Shorthand Reporters License	15 including Certified Realtime Reporter; Registered Professional Reporter; Real-time Verbatim Reporter; and Trial Presentation Professional	http://www.onetonline.org/link/summary/23-2091.00#Education
49-2092	Electric Motor, Power Tool, and Related Repairers	5	N/A	N/A	http://www.onetonline.org/link/summary/49-2092.00#Education
49-9092	Commercial Divers	3	N/A	Diving Supervisor; Open Water Scuba Instructor; Divemaster; Bell/Saturation Diving Supervisor; and Mixed Gas Diving Supervisor	http://www.onetonline.org/link/summary/49-9092.00#Education
49-2093	Electrical and Electronics Installers and Repairers, Transportation Equipment	3	N/A	Mobile Product Specialist; Traffic Signal Senior Field Technician; Certified Electronics Technician - Associate-Level; Certified Electronics Technician - Journeyman-Level - Radar	http://www.onetonline.org/link/summary/49-2093.00#Education
29-2092	Hearing Aid Specialists	2	Hearing Aid Dispenser License; School	Board Certified in Hearing Instrument Sciences	http://www.onetonline.org/link/summary/29-2092.00#Education
27-4014	Sound Engineering Technicians	2	N/A	15 including Audio Systems; Certified AM Directional Specialist; Certified Audio Engineer; Media Composer Professional; and Certified Broadcast Networking Technologist	http://www.onetonline.org/link/summary/27-4014.00#Education

SOC	Title	Total Annual Demand	Licenses (State)	Certifications (National)	Credentials Link
13-1032	Insurance Appraisers, Auto Damage	2	N/A	Collision Repair and Refinish: Damage Analysis and Estimating; Associate in Claims - Management	http://www.onetonline.org/link/summary/13-1032.00#Education
49-9045	Refractory Materials Repairers, Except Brickmasons	1	N/A	N/A	http://www.onetonline.org/link/summary/49-9045.00#Education
39-4011	Embalmers	1	Embalmer; Embalmer Apprentice Registration	N/A	http://www.onetonline.org/link/summary/39-4011.00#Education
49-9097	Signal and Track Switch Repairers	1	N/A	Rigger and Signal Person Certification	http://www.onetonline.org/link/summary/49-9097.00#Education
39-5091	Makeup Artists, Theatrical and	0	N/A	N/A	http://www.onetonline.org/link/summary/39-5091.00#Education

Source: JobsEQ® and O*NET
Data as of 2014Q2

V. Key Findings and Conclusions

The list of 74 occupations should be further refined to a smaller list that can be the focus of specific targeted intervention by the San Bernardino County WIB. As suggested in the previous report, focus groups and interviews with some of the area's larger employers, community colleges, and WIB professionals should provide the basis for identifying those select occupations where the supply of qualified candidates is the most constrained.

The type of intervention needed to strengthen the talent pipeline may include discussions with local community colleges and workforce development practitioners which will yield insight as to whether the constraint is more likely a function of insufficient enrollment in key programs or a failure to complete, including applying (e.g. sitting for an exam) for final credentialing. It is likely that marketing efforts to increase enrollment in programs designed to feed select occupations may require outreach to neighborhoods with low-educational attainment populations. It is equally possible that special incentive plans or targeted assistance may be required to overcome social barriers that have thus far inhibited some individuals from seeking postsecondary educational opportunities. In addition, there may be opportunities to advance the skill-sets of some unemployed workers with prior work experience and potentially some stackable credentials within several construction-related trade fields for occupations that require advanced electro-mechanical trouble-shooting skills.

Other key occupations will inevitably require increasing the enrollment and subsequent graduation of individuals with at least a 2-year associate's degree in STEM fields. Providing more money toward high school STEM programs is one necessary step. One local example of a program designed to promote STEM learning is San Bernardino County's Alliance for Education; the Alliance for Education is a partnership between business and education communities which serves students in kindergarten through college. The goal of the program is to prepare the county's youth for STEM careers with employers in San Bernardino County.[13] In addition, outreach and marketing efforts designed to convey to students the value of a STEM degree will help students make educated decisions about which field of study to pursue. A potential opportunity to expand enrollment in associate's degree programs in STEM fields is to create public-private partnerships which feature a grades 9 through 14 model, like IBM's Pathways in Technology Early College High Schools (P-Tech) wherein students graduate with an Associate's degree in Applied Science after six years.[14]

---

[13] http://www.sbcalliance.org/overview. In addition, San Bernardino County's Education Element Group has adopted a roadmap to support the success of every child in the county from cradle to career. http://wp.sbcounty.gov/cao/visionwire/?p=58

[14] https://www-03.ibm.com/press/us/en/presskit/42300.wss

VI. Appendix

The following section contains supplementary information relevant to this report.

Terms & Definitions

Demographics: All data are from the U.S. Census Bureau per the dates shown in the profile table footnotes included in the accompanying spreadsheets.

Current Employment & Historical (3-Year) Job Growth: Measures the current employment and past performance of an industry sector and identifies whether industries have been growing/declining/emerging and the rate of change. Employment and wages data are derived from the Quarterly Census of Employment and Wages, provided by the Bureau of Labor Statistics and updated through 2013Q4 with preliminary estimates by Chmura updated to 2014Q2. Forecast employment growth uses national projections from the Bureau of Labor Statistics, forecasts for 2012-2022, adapted for regional growth patterns by Chmura.

Projected Job Growth (3-Year): Incorporates historical growth and performance with additional factors and expectations of growth/decline of the region's working-age population, industry mix, educational attainment, and regional growth expectations. The JobsEQ® Baseline Forecast comprises industry and occupation projections based, in part, upon the Bureau of Labor Statistics (BLS) national forecasts or state forecasts provided by state employment agencies.

Location Quotient & Location Quotient Trend: The location quotient variable is a comparative statistic used to calculate relative employment concentration of a given industry against the average employment of the industry in the nation. Industries with a higher location quotient (usually greater than 1.25) indicate that the region has a comparative advantage or specialization in the production of that good or service.

Industry Competitiveness 3-Year (Shift-Share Analysis): A standard method of regional economic analysis that attempts to separate regional job growth into its component causes. The three main causes identified are the "national growth effect," which is regional growth that can be attributed to the overall growth of the entire U.S. economy; the "industrial mix effect," which is regional growth that can be attributed to positive trends in the specific industry or occupation at a national level; and the "regional competitiveness effect," which is growth that cannot be explained by either overall or industry-specific trends. This measure can be measured in terms of economic output or employment, and the examples found in this report utilize employment levels. A positive value indicates that an industry has a regional competitive advantage compared to the nation in terms of generating employment. Positive shift share values do not explain why an industry has a competitive advantage, only that there are potential factors that contribute to the industry's ability to outperform the national average rate of growth/decline.

Average Annual (Industry) Wage & Wage Trend: This statistic is based on an industry staffing pattern and the average occupational wage associated with that staffing pattern for a given region and industry. Employment and wages data are derived from the Quarterly Census of Employment and Wages, provided by the Bureau of Labor Statistics and updated through 2013Q4 with preliminary estimates by Chmura updated to 2014Q2.

Wages & Unemployment Rate by Occupation: Occupation average wage data are derived from national occupation/industry wage data provided by the Bureau of Labor Statistics modified where necessary. Wages by occupation are as of 2013 provided by the BLS and imputed by Chmura where necessary. All occupation data are presented in terms of at-place employment except for occupation unemployment and unemployment rate which are

calculated by place of residence. Occupation unemployment figures are imputed by Chmura. Employment forecasts are developed by Chmura using occupation forecasts from the BLS.

Long-run (3-Year) Occupational Forecast: Average Annual Growth Rate: Forecast employment growth uses national projections from the Bureau of Labor Statistics, forecasts for 2012-2022, adapted for regional growth patterns by Chmura. Occupation employment data are derived from the most recent industry employment (from the Bureau of Labor Statistics, updated quarterly) and the industry/occupation matrix available for the region. Although JobsEQ baseline forecast may use national forecasts (by industry or occupation), these forecasts are adjusted to be more reflective of the region rather than the nation by taking into account the unique industry/occupation mix of the region as well as the region's general overall growth expectations. Regional employment growth expectations are modeled to be consistent with US Census population forecasts, labor market commuting patterns, and expected changes in participation rates over time by education level.

Training Concentration: This analysis provides an estimate of supply and demand alignment between local postsecondary training output and the demands of local area industries.

A training concentration of 100% means that a region is producing a number of awards per occupation employment that matches the national norm. A training concentration of 200% means the region is producing twice the number of awards than the national norm and a training concentration of 50% means the region is at half the norm. For example, if postsecondary schools in the nation grant awards for registered nurses at the rate of one award for every ten nurses employed, and if a region grants awards at the rate of one award for every twenty employed nurses, that region will have a training concentration of 50% for registered nurses.

Awards data are estimates, produced via a Chmura algorithm that distributes degrees conferred for the academic year 2012-2013, data for which are provided by the National Center for Education Statistics. Occupation employment data are estimated via industry employment data and the Chmura industry/occupation matrix. Industry employment data are derived from the Quarterly Census of Employment and Wages, provided by the Bureau of Labor Statistics and currently updated through 2013Q4 with preliminary estimates by Chmura updated to 2014Q2.

The education program to occupation crosswalk methodology description refers to the training concentration analysis. Training programs are classified according to the Classification of Instructional Programs (CIP codes). For relating training programs, this report uses a modified version of the CIP to SOC crosswalk from the National Center for Education Statistics (NCES). While this is a very helpful crosswalk for estimating occupation production from training program awards data, the crosswalk is neither perfect nor comprehensive. Indeed, it is hard to imagine such a crosswalk being perfect since many training program graduates for one reason or another do not end up employed in occupations that are most related to the training program from which they graduated. Therefore, the education program analyses should be considered in this light.

As an example of the many scenarios that may unfold, consider a journalism degree that crosswalks into three occupations: editors, writers, and postsecondary communications teachers. Graduates with a journalism degree may get a job in one of these occupations—and that may be the most-likely scenario—but a good number of these graduates may get a job in a different occupation altogether (the job may be somewhat related, such as a reporter, or the job may be totally unrelated, such as a real estate agent). Furthermore, a graduate may stay in school or go back to school for a degree that will lead to other occupation possibilities. Still another possibility includes the graduate not entering the labor market (maybe being unemployed, being a non-participant, or moving to another region).

Given this background, training concentration gaps that are close to the average value of 100% (such as within 20 percentage points) should largely be viewed as having supply and demand for those occupations to be roughly in

equilibrium. However, in areas where the training concentration is significantly lower (such as below 80%), one can infer a substantial deficit of training for this occupation exists that corresponds to a market opportunity. The threshold where a shortage can be clearly identified varies based on the size of the region, with larger regions allowing a finer estimate of the shortfall.

Occupational Replacement Demand: Replacement demand is the minimum demand due to separations such as retirements and moves into different occupations. Said differently, it is an estimate of the minimum number of workers that would need to be hired to replace those incumbent workers that due to retirement, death, incarceration or a permanent move into an alternate occupation will need to be back-filled by their employer.

The methodology for this estimate is based upon BLS-derived techniques. To develop estimates of replacements, the BLS used occupational employment data from the Current Population Survey (CPS), a household survey that collects demographic and employment information about individuals. BLS analysts measured the net change in occupational employment for 13 different age cohorts over a 5-year period.

Long-Run (10-Year) Expected Occupational Gap: Gaps projection data are developed by Chmura and updated quarterly. Employment supply and demand projections are based on a starting date of 2013Q4. Technical Notes: Occupation gaps are developed by Chmura and use a multitude of data sources. This analytic is updated quarterly along with ES-202 updates. Gaps are forecast based upon the educational make-up of the region's first-time workers and include changes due to replacements. For example, consider the case in which a retail salesperson gets a degree, leaves their occupation, and becomes a financial analyst. This turnover dictates that a new retail salesperson is needed. Even though the total number of retail salespersons in the region is unchanged, the analysis counts this situation as an increase of one in demand for retail salesperson. The forecasts that are provided are long-run (over a period of three, five, or ten years) and do not fully account for short-run imbalances in the workforce. The short-run deficit is not accounted for in the forecast gap because of the long-term perspective of the gap. From a practical perspective, Chmura created the gaps to have a long-term view because it is highly relevant for strategic planning.

- **Annual Supply Gap (or Surplus) -** The annual average difference between projected supply and demand. A positive number represents a deficit in workers and a negative (parenthetical) number represents a surplus of workers.
- **Annual Growth Demand -** The demand due to overall growth in that occupation.
- **Annual Replacement Demand -** The minimum demand due to separations such as retirements and moves into different occupations (based on an annual average over the next ten years).
- ***Total Annual Demand* -** The sum of growth and replacement demand (if growth is positive, otherwise, this is simply replacement demand).